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MAMMALS FROM THE BLUE NILE VALLEY.

BY GLOVER M. ALLEN.

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No. 7.— *Mammals from the Blue Nile Valley.*

BY GLOVER M. ALLEN.

IN January and February, 1913, I accompanied Dr. J. C. Phillips on his expedition up the Blue Nile and the Dinder River in the interests of the Museum. A considerable effort was made to collect the birds (see Bull. M. C. Z., December, 1913, 58, p. 1-28) and mammals of the region, and Dr. Phillips has generously left to me the working out of the latter. Our route lay along the Blue Nile, from Sennar, where our real start was made, to Singa, the present seat of government for Sennar Province. At this point we crossed to the north bank, for the south bank is a game reserve, and proceeded along it to the Abyssinian border, stopping at Fazogli, an outlying 'gebel' of the Abyssinian foothills. We later retraced our steps to Abu Tiga, and thence crossed over to the Dinder, an affluent of the main river, that becomes partly dry in the rainless season. The upper portion of this river seemed to have been very little disturbed, and large game was abundant and very unsuspicious. Along the Blue Nile, however, and on the lower parts of the Dinder, the native population is increasing and there is much travelling up and down along the river banks. On the Blue Nile especially, parties of Arabs and negroes are constantly passing, and English officials make their rounds between Singa and Roseires or other points. With the increase of native population, the clearing of the land, and disturbance incident to human occupation, the large game must inevitably be gradually driven back or exterminated by hunting. It is generally believed that the native population of the Sudan, during the time of the Mahdi and his successor (1883-1898) was reduced through war, famine, and disease about 75%, amounting to the almost total extinction of the inhabitants along the Rahad and Dinder, as well as on the Blue Nile, so that many of the villages marked on the older maps no longer exist. This no doubt has been favorable for the increase of large game in later years. On these rivers now, however, the habitations are being reestablished gradually, and population will doubtless reclaim the country in time. It therefore has seemed worth while to record the more striking facts we noted concerning the habits and distribution of the larger mammals, for they must eventually be much reduced or destroyed altogether. A few species seem better adapted to survive

than others and these, on the Blue Nile, for example, already show through their difference of habits, compared to their congeners of the upper Dinder, an adaptation to the changing conditions.

The entire country up to the Abyssinian border is monotonously flat, and covered largely with an open forest of thorn trees among which the red-barked gum-arabic tree is conspicuous. A very few

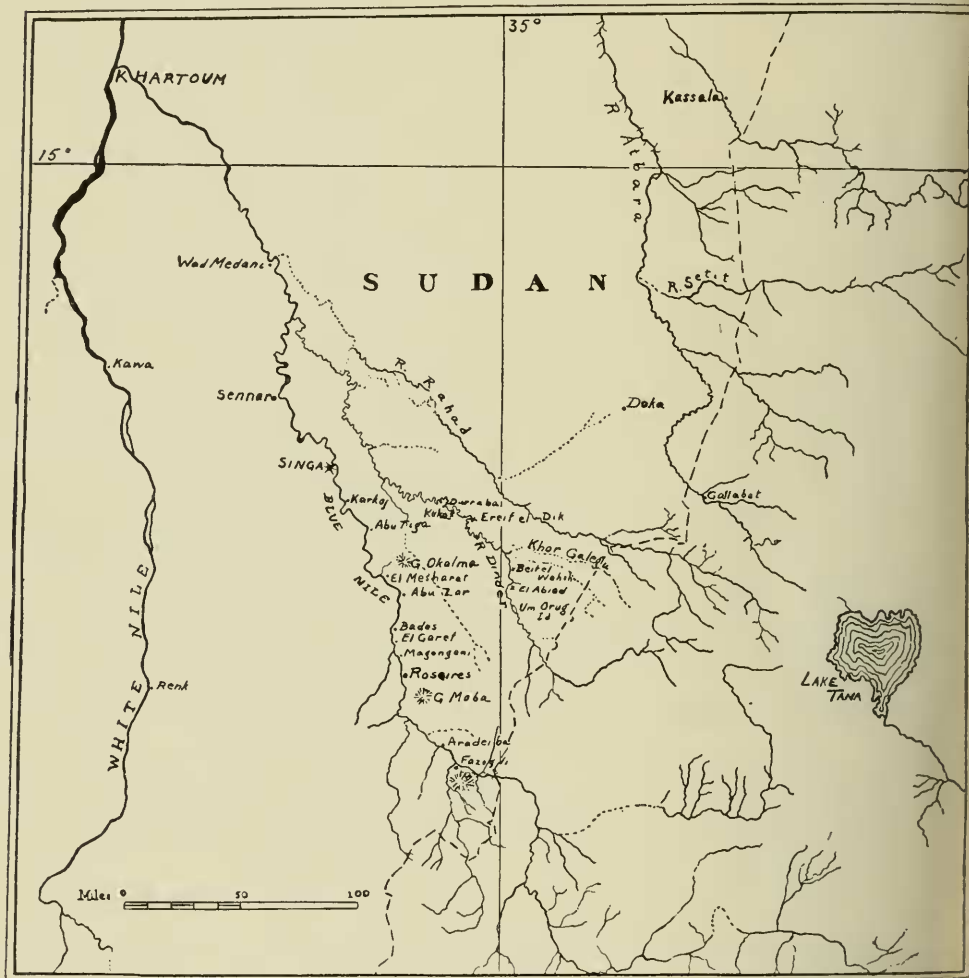


Fig. 1.—Sketch map of the Blue Nile Valley.

small and isolated hills or 'gebels' project here and there abruptly from the plain, and alone break its monotony. The Blue Nile has cut a channel through this broad plain, but so steep are its banks for many miles in succession, that access to the water is difficult, and hardly to be obtained except where gullies, cut down during the torrential rains



of the wet season, afford a passage. As settlements increase along the rivers, the native villages are planted at such spots, termed 'mesharats,' or "places where one can get down to the water." Since the large mammals are also dependent on these for reaching the water, the settlements result in driving them farther and farther away where there are 'mesharats' at a distance from habitations, with their accompaniment of droves of cattle, yelping dogs, and native hunters.

The luxuriant growth of tall grass that springs up after the summer rains becomes exceedingly dry by late autumn, and the natives set fire to it and burn the country for many hundreds of square miles. The soil itself becomes transformed from a mass of sticky mud in the wet season to a hard baked or a powdery condition, often much cracked and very difficult for walking. Such unfavorable conditions appear to have had a direct influence in reducing the ground-living species to a minimum, so that it was very hard to obtain small mammals, and even in comparatively sheltered places the number of species was disappointingly few. According to local report, there is much more large game along the Blue Nile during the wet season and just previous to it, in April and May, when the drying up of the smaller and remoter pools forces the animals to seek the main stream. The rank growth of vegetation during the summer rains also causes a more general dispersal.

There has been but little collecting done in the area covered, though travellers have from time to time sent specimens to Europe. As long ago as 1842, Sundevall published descriptions of mammals obtained in Sennar by the Swedish traveler Hedenborg, but as then used, Sennar was a somewhat indefinite term applied to the country between the White and the Blue Niles. Rüppell and Heuglin later did much exploration in northeastern Africa, including journeys into the Sudan. They gave names to many of the species whose range includes the Blue Nile country. What has since been done in the study of the mammalian fauna of the region has been of fragmentary nature, and consists chiefly of reports on occasional specimens sent by Europeans to the museums of England and Germany. In 1898, Lord Lovat's expedition crossed from southern Abyssinia to the Blue Nile Valley, and obtained a few specimens from the latter region, including a new multimammate mouse, described by de Winton (1900). Captain S. Flower, of the Gizeh Zoölogical Gardens has several times been to the region to obtain living animals for the splendid collection under his charge. Mr. A. L. Butler, head of the Game Preservation Department of the Sudan, also knows the country well and has sent many specimens of birds and mammals to the British Museum.

In general the mammalian fauna may be said to be typically African, with almost no trace of Eurasian species. It is a continuation of that of the upper Nile, though rather more reduced, and in the region covered, quite without any of the desert species found in the Saharan sands to the north and northwest.

The list of species observed follows.

### SYNCERUS AEQUINOCTIALIS (Blyth).

#### Nile Valley Buffalo.

*Bubalus caffer aequinoctialis* Blyth, Proc. Zool. soc. London, 1866, p. 372.

*Bubalus azrakensis* Matschie, Sitzb. Ges. naturf. freunde, Berlin, 1906, p. 169.

In his review of the African buffaloes Matschie describes *Bubalus azrakensis* as a new species; it is based upon an imperfect skull from Roseires on the Blue Nile. He says that it belongs to those forms in which the horn is strongly bowed downward and differs from all the other species in that the inwardly bent tips of the horns turn suddenly back at the ends. This appearance is shown in his photographic figure, in which, however, one of these tips is broken off. Moreover, as the figure shows; the skull is that of an immature animal in which the basal portions of the horns are unsolidified and have not been preserved, although the spread is 84 cm., a fairly large size for Nile Valley animals. The horns of three old bulls shot by Dr. Phillips on the Dinder River, are heavy and massive, the bases very broad, but not joining medially on the forehead, nor are they convex in this region as in the *caffer* type, but flattened, ridged, and broadly excavated. Their downward sweep reaches only about to the level of the orbit and the tips are blunt and rather short, due in part to wear. Cotton (1912) says that the horns of cows have a deeper curve than those of the bulls and are not so wide. The long points, backwardly turned, of Matschie's *azrakensis* seem more like an individual variation in an immature animal. In view of these facts, it does not appear that the Buffalo of this region is satisfactorily distinguished from *aequinoctialis* of the White Nile, so that it is best at present to use this latter name to include the Buffalo of the Blue Nile as well. The generic name *Syncerus* was revived in 1911 by Hollister to distinguish the African Buffalo from the Water Buffalo — *Bubalus*.

The following measurements of Dr. Phillips's specimens were made in the field:—

	1	2	3
	mm.	mm.	mm.
Nose to root of tail	2615	2470	2400
Tail (from anterior base to tip)	785	700+	795
Calcaneum to tip of hoof	595	610	615
Ear from meatus to tip	—	290	290
Standing height at shoulder	1680	1570	1660
Half girth back of fore leg	—	1150	1145
Fore hoof, length of under side	190	180	170
“ “ greatest breadth	135	140	125
Hind hoof, length of under side	140	160	160
“ “ greatest breadth	110	125	110
Greatest expanse of horns, outside	745	850	880
Greatest width of basal expansion of horn	210	230	210

From these measurements it appears that the animal with the smallest spread of horns was the largest in body. The one with the broadest spread, however, (880 mm. = 34.5 inches) did not have the broadest base. The greater size of the anterior hoofs is also apparent; and is greatest in the largest-bodied specimen with the least spread of horns.

Buffalo are now rare on the Blue Nile, at least along the north bank where our route lay. The only place where we learned of their presence was near a small native village called Omdurman, a few days' journey below Roseires. Here apparently was a small herd of perhaps eight or ten, that came almost nightly to the edge of a large marsh or to the vegetable gardens of the natives. They were very wary and during the day were not to be discovered, for they frequented the thickest cover along the river. As the natives are without firearms, the Buffalo have little to fear from them, though with shouts and firebrands at night the men often frighten them from the growing crops. Passing sportsmen, or English officials, however, sometimes stop to hunt here. Cotton (1912) notes Buffalo at El Garef. Matschie's specimen of *B. azrakensis* is said to have come from Roseires, but may not have been shot in that immediate vicinity.

It was not until we reached the Dinder that we found Buffalo in any numbers. As the district was closed for a time, we were obliged to retrace our steps from Roseires several days' journey down stream before we were allowed to cross over, a two days' march to the Dinder. This stream goes partly dry in the rainless season, so is much less disturbed and only very sparingly settled by natives. At El Kuka



we first found Buffalo tracks, but these indicated only a few scattered animals. Continuing several days' journey to the vicinity of Um Orug, a large island in the stream bed, we finally came upon Buffaloes in such numbers as are hardly to be found elsewhere in Africa at the present day. At Khor Galegu was the last native village, and at some distance above this began a series of so-called 'meres,' which are great marshy areas often a mile long, and even at this dry season (February) moist or even boggy, with a rank growth of high grass, now largely eaten down by the wild game. For to these places resorted the large ruminants for miles around. It was near such a meadow, near Um Orug that we encountered a herd of some 250 Buffalo as they came at sunset to drink at a large pool in the river bed. Later we saw what was no doubt the same herd on a great 'mere' below this spot. On a 'mere' near a camping spot called Beit el Wahsh, we saw a second herd of about 100 old and young, and near a camp El Abiad, a herd of some sixty or more on a similar 'mere.' A very large old bull was seen here, that seemed to have been driven from the herd and was at the opposite side of the 'mere.' This and two other old bulls that were found together on another 'mere' far from any herd, fell to Dr. Phillips's rifle. They were all much battle-scarred, and one had lost an eye, and its ears were badly torn.

The appearance of a herd of Buffalo at a distance is highly characteristic. They mass closely together, and their great black bodies form a solid rank, whose outline is hardly broken by the heads and horns, as these are carried nearly on a level with the back. The small White Egret often feeds close among the herds. At Abiad we saw a large flock of these birds, their white plumage in strong contrast to the black bulk of the great beasts.

#### STREPSICEROS STREPSICEROS CHORA (Cretzschmar).

##### Northern Greater Kudu.

*Antilope chora* Cretzschmar, Rüppell's Atlas reise nördlichen Afrika. Säugeth., 1826, p. 22.

Pocock (1905) has proposed to distinguish the Greater Kudu of northern Africa as a distinct race from that of South Africa, and revives Cretzschmar's name for it. It is readily distinguished by its fewer white body stripes.

Unquestionably the Kudu is the finest of the antelopes of the Nile

Valley. Its wariness, its love for hilly or broken ground, its keenness of sense, and its handsome appearance make it by far the most noteworthy of the large game mammals of the country it inhabits. Its present distribution along the Blue Nile is very interesting, as it frequents the narrow and intermittent strip of broken ground a short distance back from the river where torrential streams have worn little valleys or 'khors' in a soil locally harder or more gravelly than most of the level plain of the great river. Here there is more or less good cover, clumps of thorn bush, tall grass, or vines, which added to the irregular nature of the ground, forms a tolerable shelter.

The method of hunting is to follow the track and by keen watching and silent following, to discover the animal before he is aware of the pursuit. Owing to the somewhat dense cover, however, or the dry grass and twigs, this is a difficult matter. It is usually the case, that the bulls are apt to be solitary and are much more difficult to approach than the cows, which often go in bands of three or four. We startled a company of three near Gebel Maba, and were told of a band of four being seen near Roseires. The former is a favorite haunt, an isolated and irregular hill, very stony, though with few large boulders, and covered with thorn trees. Mr. Savage at Roseires had lately taken a bull with fine head a few miles back from that post, and said that it was accompanied by a cow. Dr. Phillips at one time found a bull and calf together near Magangani, and spent much time following others at various points as far down the river as the neighborhood of El Mesharat, where he heard one giving its characteristic bellow. This sound is made by both bulls and cows. Near Magangani, Dr. Phillips was once watching a Kudu cow as she was lying down, a hundred yards distant. Presently she rose to her feet and began to bellow at regular intervals of five seconds. As described by Dr. Phillips the sound is a single low explosive puff, like that of a distant freight engine heavy laden. This bellow he several times heard while following a Kudu track but the wary antelope always kept ahead just out of vision. The bleaching skulls and skeletons of male Kudu are not infrequently found, but those of cows much less often. Some perhaps are killed by lions, or wounded by hunters and lost. Certainly however, there are comparatively few bulls left along the Blue Nile.

On the Dinder River, the Kudu is practically absent except in a small stretch just below Um Orug, where Dr. Phillips heard the characteristic bellow and saw tracks. No doubt there are Kudu above his point but we did not go farther.

There is much variation in the angle at which the horns come off

from the skull, as well as in the openness of coiling of the separate horns. Some are more open and divaricating, others a slightly closer spiral and the horns nearer together. The native hunters consider that there are two sorts of Kudu, which really are but the extremes of these two types. They call the former *ghazáwi*, the latter *karóri*, and believe each animal is the property of some spirit who marks his animal that he may be known to his owner. The slit ear of one specimen is thus taken to be such a mark.

The hoofs are remarkably delicate in proportion to the size of the animal and to an experienced eye, make a characteristic track.

In the stomach of an 11-foot crocodile killed above Bados, Dr. Phillips found what seemed to be the hoofs of a Kudu.

#### TRAGELAPHUS DECULA (Rüppell).

##### Abyssinian Bushbuck.

*Antilope decula* Rüppell, Neue wirbelth. fauna Abyssinien. Säugeth., 1835, p. 11, pl. 4.

A few Bushbuck may be found along the Blue Nile at Abu Zor and beyond, but they are uncommon and solitary in habits. At El Garef we heard in the early evening what our native hunters assured us was their curious sharp bark of alarm, reminding one of a small terrier. Cotton (1912) mentions finding Bushbuck at Bados and Magangani. It is apparently less common on the Dinder, for we met with it but once, at Um Orug where Dr. Phillips obtained a young male.

#### EGOCERUS EQUINUS BAKERI (Heuglin).

##### Baker's Roan Antelope.

*Hippotragus bakeri* Heuglin, Nova acta Acad. Leop. Carol., 1863, 30, art. 2, p. 16, pl. 2, fig. 6.

This fine Antelope is still to be found in small numbers on the north bank of the Blue Nile in the vicinity of Bados. They are shy, however, and seem to use much caution in approaching the river to drink. This they do at some very early hour, and are far back in the dry thorn bush by daybreak. At Magangani, near Roseires, a small herd passed within a stone's throw of our encampment during the night, on the way to the water. Cotton speaks of finding one at Gebel Maba, some distance above Roseires, but there seem to be few beyond that



point. At Bados we spent a day hunting the Roan, with a skilful native tracker. The animals were well back from the river, and after about an hour's walk we reached their country, and spent some hours following tracks on the powdery "cotton soil" in the thorn scrub. The tracks were mostly of single animals or pairs, and we found where they had roamed about stopping here and there to bite off a green twig of a particular species of thorn, white-barked and with small obovate leaves. The Antelope were extremely shy and several broke away before we had even sighted them. Finally Dr. Phillips successfully stalked to within ninety yards of one lying apparently asleep under a 'laloab' tree, at noon. But the watchful animal was quick to detect the motion of the binoculars, even at that distance and down wind, and leaped to its feet, a fine imposing creature. When startled at close range, the Roan as it bounds away makes a sound like a "sneezing cough."

On the Dinder, there are many more than on the Blue Nile. For some distance above the villages where the river bank is more or less travelled by Arab gum pickers and hunters, the Roan are shy, and their tracks, which we began to find at the camping spot, El Kuka, usually led straight back into the thorn scrub, so that it was fully a mile from the stream before the trails began to break up. Beyond the junction of the Galegu we saw many Roan. They had evidently been little disturbed here and travelled in bands of as many as fifteen to twenty-five, taking no apparent precaution to avoid the river borders. Unlike the other antelopes, they seemed to avoid the open 'meres' but were usually in the scattered tree growth, or the edge of the tall grass and bushes near the stream. They seemed to browse rather than graze. At Abiad several came to water at a pool of the Dinder, in mid-afternoon, and it was interesting to see some drop to their knees to drink, though others drank standing.

Owing to its wariness and its habit of retiring far back from the travelled river banks, this large species will no doubt continue to survive along the Blue Nile for some time longer. Cotton (1912, p. 53) believes that they drink only about twice a week, so are able to go a long way from water. He says they are still common on the Setit and the Atbara Rivers, in the uninhabited portions, but no longer exist on the Rahad.

The stomach of one contained in the first compartment over a peck of the small twigs and leaves of a gray-barked thornbush, as well as a number of 'laboab' fruits, whose large stones are evidently masticated with the cud, instead of being regurgitated as with the smaller gazelle.



## GAZELLA SOEMMERRINGI (Cretzschmar).

## Ariel or Sömmerring's Gazelle.

*Antilope soemmerringii* Cretzschmar, Rüppell's Atlas reise nördlichen Afrika. Säugeth., 1826, p. 49, pl. 19.

Of this species, Cotton (1912, p. 57) writes: "On the Atbara . . . it was a rare animal; but throughout the Setit it was very abundant, and on the Rahad, from a march or two above Hawata to the Abyssinian border, the ariel were to be numbered only by thousands, and their presence obviously accounted for the number of lions. There were large herds on the Galegu and Dinder, but not many of them, and on the Blue Nile I did not see a single specimen." It is the only species of gazelle that we found in all the country traversed. Cotton did not learn of its presence on the Blue Nile, but we saw a few back from the river near Bados, which appears to be the last remaining stretch of good game country on the north side of the river. This is no doubt because there is an area of marsh along the river which allows the animals to come to water without passing too close to villages. They must drink very early in the morning, for they are well back in the thorn scrub by daylight. On the south bank of the Blue Nile there are good numbers still, as we were informed by some officers of the Scots Guards, who obtained several heads there during our stay in the country. That side of the river is much less populated and is a reserve for use of officials only. In crossing from the Blue Nile to the Dinder, from Abu Tiga, we saw a single bunch of three Ariel, but they are clearly very scarce in the region.

It was not until we had proceeded some distance up the Dinder that the Ariel began to appear. Near Ereif el Dik, a camp site by the bank, we saw a few coming from the water in early forenoon, and from this point on to Um Orug they were common, far outnumbering all the other antelopes. At times they were in sight nearly all day in smaller or larger bands; frequently we started them in the forenoon at eight or nine o'clock coming from the water, and I have seen them come to drink as late as 12.30 P. M., for here they seemed to have been undisturbed for some while, and had lost much of their wariness of human kind. They are a most social species and gather into bands that number often fifty, seventy-five or a hundred approximately, of both sexes, and in early February the females were often accompanied by young fawns. It was common to find single animals as

well, and these were usually old bucks. One which Dr. Phillips shot, showed many battle scars about the neck from the horns of some others of its kind, by which it had probably been driven from the herd. Once I saw a young buck butting playfully at the rear of one in front, and on another occasion Dr. Phillips had a good opportunity to observe their manner of fighting. Two bucks were seen fencing. They would lower their heads and catch each other's horns by the hook-like tips. Then followed a sort of tug-of-war in which one tried to pull the other about while their horns were thus interlocked. Sometimes they would butt at each other, and inflict sharp digs on the neck with the incurved tips of the horns.

The chief food seemed to be grass, which was very closely grazed down on the 'meres.' Away from these places there was very little green vegetation except bushy growth, but everywhere the sprouting grass stalks were cropped off, and it was clear that green pasturage was none too plentiful for the big herds. The Ariel eat quantities of the date-shaped fruit of a species of thorn tree called the 'laloab,' which they pick up from the ground. This has a thin but juicy and rather acrid pulp with a large stone, enclosing a seed which is ground and eaten by the negroes. The stones appear to be regurgitated after the pulp has been digested, and it was common to find little heaps of half a dozen or so of these, quite cleaned, deposited on the ground. Our native hunters said that these were left by the Gazelles, after having been regurgitated, and though we did not actually see the process, there is no reason for doubting that this is the truth.

These Gazelles seemed to be the most wary of the smaller antelopes. When feeding on the open with other grass-eating species, they were usually the first to take fright at our approach, and would move off, slowly at first, gathering sometimes into dense bunches like sheep, which they further simulated in their very whitish appearance. They are very conspicuous against the dark "cotton soil" or the burned areas, but among the dry and withered grass or on sand the contrast was less. They are constantly switching their tails from side to side, both when running or when standing, as though from sheer nervousness. I have seen the same habit in the Thompson's and Grant's gazelles. When surprised near the drinking places, they always seemed much concerned to get back from the belt of tall grass or shrubbery near the bank of the stream, but on reaching the more open thorn scrub, would stop to look about. Evidently they feared lions or leopards lying in wait at such places. Lions certainly kill good numbers, and we found the remains of several recent "kills." It was

noticeable that most of these were youngish animals of small horns, no doubt the less experienced or less wary members of the herds. Occasionally aged animals are also killed, possibly because they are less able to escape through battle wounds or sickness. The result is therefore that in nature, the greatest mortality is among the youthful and inexperienced or among the aged and outworn. The finest specimens tend thus to be left to perpetuate the herd. It is worth noting that the effect of human game-protective laws is more or less the reverse, for the sportsman is usually content to let the poorer heads go, and to cull out those with the finest horns. In addition to lions, the Ariel evidently have much to fear from the crocodiles that lurk in all the large pools. In the stomach of one shot at Gosar, Dr. Phillips found horns of three Ariel, a doe and two small bucks, apparently. If possible the Gazelles will drink at a shallow pool in preference to a large deep one, in which there are likely to be crocodiles. It would be interesting to know how active these Gazelles are by night. While marching by moonlight along the Dinder, we once came upon two that seemed to be grazing, and again in the dim light preceding dawn I found a few single animals moving about near the stream.

The type locality of this species is the border of the Red Sea, but it has not yet been shown that the Ariel of the eastern Sudan is different, although two other races are described from more southern areas.

#### CERVICAPRA BOHOR (Rüppell).

##### Bohor Reedbuck.

*Redunca bohor* Rüppell, Mus. Senckenbergianum, 1845, 3, p. 182.

The Reedbuck is no longer common on the Blue Nile, and we met with it at but two places, El Mesharat and Bados. It is a most unsuspicious animal and no doubt one that will soon be much reduced in numbers. It has a way of standing broadside to the intruder, the hind feet one in advance of the other, and with graceful head turned, it sniffs the air and watches until certain that there is cause for alarm, when it bounds away with tremendous leaps. On the Dinder it was very common above El Kuka, and on the great open 'meres' and along the grassy jungles by the stream bed they were found feeding throughout the day. They seemed to have been undisturbed here for a long period, and in contrast to their behavior on the Blue Nile, where they

had learned to keep under cover during most of the daylight hours, they were extraordinarily tame. Unless the wind brought the taint of human scent, they were almost without fear, but stood gazing within a few yards. On the Dinder they were commonly in small groups, often an old buck with three or four does and once a younger buck. On becoming alarmed the does would retreat at once leaving the old buck standing at gaze. We once came suddenly upon a youngish animal that evidently had not seen us until it suddenly looked up from feeding a few yards to one side of the trail. At once it dropped flat upon the ground with head stretched out. We watched it a few moments, and as soon as we passed on it lifted its head to gaze after us, but remained crouching among the few stalks of tall grass that afforded not the slightest cover.

Near Um Orug I watched a Reedbuck as it came to water, shortly after noon, with several Ariel. It drank much longer than they, stopping now and then to look about, but apparently quite unconcerned for the crocodiles, several of which lay a short distance off in the water. On one of the large open 'meres' we found Reedbuck active and apparently grazing by moonlight late in the evening. They were always the last of the antelope to take fright and run off when the caravan came out upon the 'mere' where they were feeding. We saw two large bucks, each with the tip of a horn broken off.

It is possible that our specimens may be referable to the race *cottoni* but material is not at hand to settle this point.

Johnson (1903) records killing a very large one on the Dinder at Durraba in 1901, but we saw none so far down that river.

### COBUS DEFASSA (Rüppell).

#### Abyssinian Waterbuck.

*Antilope defassa* Rüppell, Neue wirbelth. fauna Abyssinien. Säugeth., 1835, p. 9, pl. 3.

On the Blue Nile the Waterbuck is greatly reduced in numbers and no doubt will be practically gone in the course of a few years. We saw almost nothing of it on this river, though Dr. Phillips found a few near Adreiba above Roseires, and we were shown a fair head killed near the latter place by Mr. Savage, then acting chief of the district. Cotton, however, in 1911, found Waterbuck at Bados, but if any are to be found below this region, they must be rare indeed.



Quite different is it on the upper part of the Dinder. On reaching the stretches where the great open 'meres' begin, shortly below Um Orug, we found them really common. Cotton (1912) found them common on the Galegu, but saw only a few on the Dinder, below the junction of these two streams. He adds that they are not found on the Rahad, but are common on the Setit. We first found them a short distance above the Galegu, at Beit el Wahsh, where a few were feeding on a large 'mere,' and beyond this point we saw small numbers, usually feeding in similar places. At Um Orug they were plentiful and remarkably unsuspicious. Dr. Phillips at one spot came upon a Waterbuck that allowed him to walk entirely around it at a short distance. Another that he obtained must have recently escaped from a lion as its back was deeply scratched and its belly so injured that the intestines protruded through the open wound. Shortly above the Galegu junction we saw a lion stalking an old Waterbuck in the open sandy bed of the river at about midday. On one large 'mere' at Um Orug, Dr. Phillips saw ninety-seven Waterbuck at one time, quietly feeding, and later that evening we found others there, grazing by the half moonlight. This with the Reedbuck was usually the last of the antelopes to take fright when several species were feeding together. During the heat of the day they are apt to rest under the shelter of the thorn trees, and it is common to see them in small parties consisting of a buck and two or three does.

OUREBIA MONTANA (Cretzschmar).

Abyssinian Oribi.

*Antelope montana* Cretzschmar, Rüppell's Atlas reise nördlichen Afrika. Säugeth., 1826, p. 11, pl. 3.

In his original description of this species, Cretzschmar gives its known range as Bahr-el-Abiad and the mountains about Fazogli (spelled "Fazuglo"). The latter are merely hills, however, so that the name "*montana*" is somewhat misleading. This is the common antelope along the Blue Nile and is called by the Arabs "ghazal." In many of its habits it corresponds to our Virginia Deer. It inhabits the edge of the tall grass jungle along the river bank, or the bushy tangles in which it finds a safe retreat. We also met with it on the slopes of the 'gebels' or hills. It is watchful and resourceful, yet hardly to be considered shy, so that it seems well adapted to survive

in the presence of civilization, and will doubtless continue in the land long after the other species of antelopes have been exterminated. The country between Sennar and Singa is so travelled and cultivated that we saw none on that part of the road, but beyond the latter town we saw them almost daily. In the early morning they are about before sunrise feeding, but usually are less in evidence after six or seven o'clock, especially in the neighborhood of villages, for they retreat to cover and come out again towards evening. Yet we often saw them even at midday, standing in the tall grass, gazing attentively at us as we passed. Often they would stand thus watching till we were out of sight, but if alarmed by a suspicious movement or a too close approach they scurried off at once into the thick cover. Along the Blue Nile we saw them frequently in pairs, and singles, and a good number were accompanied by little fawns in January. Their curiosity is considerable and almost always causes them to stop, after the first dash, and stand broadside on watching intently the object of their suspicion, and thus affording the hunter an easy shot. Away from the river there were but few Oribi, and in crossing to the Dinder we saw but a single one not far from a small and partly dried waterhole. Along the Dinder, Oribi were abundant and we often saw small troops of four or five. Here they were little disturbed and surprisingly tame, allowing us often to approach within a very short distance. They frequented the edges of the open 'meres' with the other antelope, throughout the day. Their cry of alarm is a sharp whistled "phēē-u," not so hoarse, it seemed to me, as the somewhat similar whistle of the Reedbuck.

It is often difficult to distinguish Oribi from small or hornless Reedbucks, especially as the two occur together along the edges of the grass jungles, but there are several very characteristic traits that serve to identify the two. In running away the Reedbuck holds its tail tightly down between its legs, whereas the Oribi holds its tail stiffly erect, exposing the blackish skin about the anus. Its gait is also stiffer, with a sort of bobbing up and down of the hind quarters as it scurries along, whereas the Reedbuck has a much freer gait, and often takes beautiful deer-like bounds, fore feet out in front, hind feet straight out behind, as it clears some obstructing bush.

In reporting on the mammals obtained by Lord Lovat's expedition from southern Abyssinia to the Blue Nile, de Winton (1900, p. 84) states that specimens of the Beira Antelope (*Dorcotragus*) were brought back. According to Lord Lovat "the Beira Antelope is common all down the Blue Nile to Roseires; it inhabits the slopes leading

down to the river-bed, and is also seen on the barer hill-tops." The presence of this hill-loving species in the Blue Nile Valley west of the Abyssinian hills would certainly be extraordinary, and I cannot but think that on reaching this low flat country Lord Lovat mistook the Oribi or the Duiker for the Beira which he had found in the higher land through which he had just passed. At all events we found no sign of it between Roseires and Fazogli during our trip.

CEPHALOPHUS ABYSSINICUS Thomas.

Abyssinian Duiker.

*Cephalophus abyssinicus* Thomas, Proc. Zool. soc. London, 1892, p. 427.

Specimens from the eastern Sudan are currently referred to this species. We met with it in the Blue Nile Valley only, and in but few places. Cotton (1912) records seeing one at Bados and it is likely that this is about as far north as it occurs on the Blue Nile. Above this point we saw a few at Magangani, and near Gebel Maba, and some numbers near Fazogli. This is a very sedentary animal, and we repeatedly found what were presumably the same individuals near the same thickets day after day. At Magangani we saw a few along the edge of a great sea of elephant grass between the river and some undulating ridges, but at Fazogli they frequented a considerable area of alternating ridges and small gullies, which with their thickets and clumps of grass or small palms were admirable hiding places. Dr. Phillips spent much time here observing them, and found them most crafty and watchful. They were usually seen in the early part of the day singly or in pairs, and had a way of hiding in clumps of vegetation to watch the intruder or slinking adroitly off under cover of an intervening bush if followed. Those living near this native village were no doubt much hunted and had become extremely adept at keeping out of sight.

DAMALISCUS TIANG (Heuglin).

Tiang Hartebeest.

*Damalis tiang* Heuglin, Nova acta Acad. Leop. Carol., 1863, 30, art. 2, p. 22, pl. 1, fig. 1a, b.

According to Cotton (1912, p. 55) this handsome antelope is now to be found on the Setit, Atbara, or Rahad Rivers, although it is



plentiful on the Galegu. We found them rare on the Blue Nile, and saw them only in a few places, near Bados and Magangani, below Roseires. They are more or less hunted here by passing sportsmen and have become shy and watchful. They usually go in small herds of ten or less and come to water at a few places removed from the villages. After drinking they at once leave the river and are some miles back in the thorn bush by daylight. On the upper Dinder, where they seemed to have been unmolested for some time, their behavior was quite different. On our way up this river we first came upon them near a loop of the stream called Ereif el Dik (the cock's comb, in allusion to the sinuous course of the stream), where a small herd was started at noon from under some 'laloab' trees, whose date-shaped fruit they had been nibbling on the ground. But it was not until the region of the big open meadows or 'meres' was reached, at Beit el Wahsh and Abiad that they were found in numbers, while from this point to Um Orug they were very common. On one such 'mere' we estimated that nearly a thousand were in sight, feeding quietly in the open most of the day, while it was not uncommon to count seventy-five or one hundred on smaller 'meres.' Contrary to their habits along the Blue Nile, they seemed to be here under no restraint, and largely avoided the dry thorn bush, but fed on the grassy 'meres' most of the day. They were nevertheless watchful and were usually the first after the Ariel to take alarm, and to run off in a somewhat panicky way. Two female specimens collected here in mid-February contained each a large foetus.

BUBALIS TORA RAHATENSIS Matschie.

Eastern Sudan Hartebeest.

*Bubalis tora rahatensis* Matschie, Sitzb. Ges. naturf. freunde, Berlin, 1906, p. 246.

The type of this race came from Shunfar, a tributary of the Rahad, and its describer mentions a second specimen from about thirty miles southwest of Lake Tana, adding that it apparently is found on the entire middle Blue Nile, the Rahad and the Dinder. We were unable to discover any sign of the species on the Blue Nile, however, and if it now occurs along that stream, west of the Abyssinian boundary, it must be extremely rare. On the upper Dinder, there are a few, but they are scarce indeed in comparison with the Tiang. From Abiad to

Um Orug we saw in all a fair number, usually in pairs, with other antelope on the great 'meres.' One herd of fifteen was deemed unusual. I came upon a fine lone bull drinking at a pool of the river an hour before noon. It seemed much astonished, but was not thoroughly alarmed until it got my scent, when with a loud explosive "oof" it bounded away.

GIRAFFA CAMELOPARDALIS (Linné).

Nubian Giraffe.

*Cervus camelopardalis* Linné, Syst. nat., ed. 10, 1758, 1, p. 66.

Thanks to governmental protection, Giraffe are still present in small numbers in parts of the Blue Nile Valley and on the upper Dinder. Mr. A. L. Butler of the Game Preservation Department said that they had very noticeably increased of late years. We saw none during our sojourn along the Blue Nile, but discovered old tracks in numbers some miles back from that stream; these were made during the rains when the ground was soft and were still (in January) deeply impressed in the sun-baked soil. The first locality where these tracks were seen was among the gum arabic trees about Gebel Okalma, near El Mesharat. A few other tracks were found, some fairly recent, in crossing from the Blue Nile to the Dinder between Abu Tiga and Wad Shara Shara. On the upper Dinder we saw several small herds of Giraffe, usually on or near the open 'meres' or boggy areas overgrown with rank grass. A fine herd of ten was seen near Abiad, and later three others. Shortly below Um Orug we saw a herd of twenty-one and later another of twenty-five and after dark came upon a small herd that took headlong flight through the tall grass. Their chief enemy is the lion, and we several times came upon dead Giraffes that had evidently been killed by them. These were usually youngish animals with the epiphyses of the bones still separate. The lions do not eat the tough hide of the Giraffes but leave this carefully separated from the carcase, and even the vultures merely pick it clean. On a 'mere' near Abiad we found a Giraffe that seemed to have died from natural causes — an old and scabby-looking animal with no external wound apparently. The gathering vultures had only just commenced upon it.

A few young Giraffes are caught alive yearly in this region by the natives, with government permission, to be sent to Cairo or elsewhere for zoölogical gardens. The natural gait of the Giraffe when walking,

is (like that of the camel) a pace — the two legs of one side acting together, but when frightened the herds go off in single file at a stiff gallop, their long necks held forward at an angle and undulating with a sinuous movement.

## HIPPOPOTAMUS AMPHIBIUS Linné.

### Hippopotamus.

*Hippopotamus amphibius* Linné, Syst. nat., ed. 10, 1758, 1, p. 74.

This fine mammal is doomed to extinction in the Nile ere many years. Not only does he present an easy mark for hunters as he rests on a sandbar but on account of his occasional attacks upon small boats and the damage done to native crops, protection is not now accorded him and his destruction is even encouraged. F. L. James, writing in 1884, of "The wild tribes of the Sudan," says that at that time hippos were no longer plentiful north of Khartoum. At Berber there were still a few but they were hunted by the natives who watched for them nightly as they came from the river to feed on the growing crops. At the present time hippos are practically gone from the river above Khartoum, though Captain S. S. Flower told us that about 1908 the tracks of one were seen that had walked across the point at the junction of the White and the Blue Niles close to that city. This was most unusual even then, however, for in 1901 I. C. Johnson (1903) recorded that during a voyage up the Blue Nile from Khartoum, the first hippo seen was near the mouth of the Dinder some forty miles below Wad Medani. He supposed this to be about its northern limit at that time. We saw no hippos on the Blue Nile until well above Singa, at El Mesharat, where there were several basking on the mud flats in the middle of the stream. They have become very shy from constant persecution by sportsmen and others passing up and down to Roseires and no doubt will soon be nearly gone from this part of the stream. We several times found their well-worn paths up nearly precipitous banks into the grassy jungles along the river and frequently heard their loud guttural honking at night. At Bados one was caught by the natives in nooses set in its path. These were attached to large wooden floats, which discovered the animal's whereabouts to his captors the following morning after it had retired to the stream. Four spearmen in a large wooden boat went leisurely forth to attack their captive, a rather small specimen, but full of fight. Previous to the

attack we watched the animal for some time and found that it came very regularly to the surface for air at intervals of 3.5 minutes. The fight was short but furious, the men jabbing with their spears each time the enraged beast rose to attack the broadside of the boat. When at last it rose no more, the watchers on the bank shouted exultingly and one twanged a small harp in praise of the hunters. No hippos were seen at Roseires, the head of navigation for large boats, but we observed a few above that town near Adreiba. On the Dinder there are very few, at least on the upper portion. This is partly on account of the intermittent nature of the stream, though in the larger pools an occasional one is found. At Um Orug a few skulls of young animals were seen, from which the front teeth had been removed. W. B. Cotton (1912, p. 43) says there are still a few in the Atbara and Setit Rivers, but none at all in the Rahad.

PHACOCHOERUS AFRICANUS BUFO Heller.

Nile Warthog.

*Phacochoerus africanus bufo* Heller, Smithsonian misc. coll., 1914, **61**, no. 22, p. 2.

Small numbers of Warthogs are still to be found along the Blue Nile and on the upper Dinder. Dr. Phillips shot one at El Mesharat and we met with a few others along the river to Roseires. On the upper Dinder we saw not a few, once a party of three large ones with four young. As noted by Cotton (1912) there seem to be few if any with large tusks in this region.

Two skulls preserved agree with Heller's description of the Nile Valley Warthog, and, as he points out, differ from the East African race in the prolongation of the parietal portion and the nearly flat interorbital region.

DICEROS BICORNIS (Linné).

Black Rhinoceros.

*Rhinoceros bicornis* Linné, Syst. nat., ed. 10, 1758, **1**, p. 56.

The Rhinoceros is nearly extinct in the eastern Sudan. In the days of Sir Samuel Baker they were plentiful on the upper Atbara and the Setit, but now apparently there are extremely few between the Nile and the Abyssinian border. It is worth recording therefore, that at



the present time they are quite gone from the Blue Nile, but a very few yet remain on the uppermost reaches of the Dinder River, about a day's march beyond Um Orug Island, as our native hunters told us. According to our Arab guide who had hunted this region, one was killed in 1911 on the 'mere' near El Abiad by a white hunter, who mistook it at night for a Buffalo. Beyond Um Orug, at a place called Hageirat, south towards the Abyssinian border a few are still to be found. The Rhinoceros is protected under the present game laws of the Sudan, but the few that survive are more or less in danger from poaching Abyssinians. Capt. Stanley S. Flower told us at Cairo that so far as he could learn there were probably not more than ten or a dozen rhinos left on the upper Dinder, and that these are probably not breeding for the natives report no tracks of young ones.

Lydekker (Proc. Zool. soc. London, 1911, p. 958) recognizes the Black Rhino of Somaliland as distinct under the name *somaliensis*, but in the absence of specimens I cannot attempt to settle the identity of the Sudanese animals.

#### ELEPHAS AFRICANUS OXYOTIS Matschie.

##### Sudanese Elephant.

*Elephas africanus oxyotis* Matschie, Sitzb. Ges. naturf. freunde Berlin, 1900, p. 196.

In reviewing the African elephants, Lydekker (1907, p. 398) considers that the form inhabiting the Blue Nile Valley and western Abyssinia may stand as a valid race. It is characterized by Matschie as having a very long and pointed lobe at the base of the ear. The upper border of the ear is much rounded but the value of this character is still under discussion. The tusks are rather small in this race, hardly above 60 lbs.

Elephants were formerly common over the eastern Sudan, and have been much hunted for their ivory. Sir Samuel Baker's accounts of their pursuit and capture by the Arab hunters, mounted on agile ponies and armed only with a keen-edged sword, are familiar to readers of African travel. At the present time Elephants are practically gone from the travelled region along the northeastern bank of the Blue Nile. I. C. Johnson, in 1901, hunted Elephant near the little village of Omdurman above Karkoj, and although a small herd of five was discovered, the animals were traveling and struck off toward the

Dinder. The southeasterly bank of the Blue Nile is a semireservation, where government officials only are allowed to hunt, and there is much less travel and native settlement. The same writer mentions that Elephants occasionally come to drink on this south bank at Zumurka, nearly opposite from Karkoj, and opposite Abu Tiga and Om Bared, farther up. The only place where we learned of their presence was opposite Magangani, a few miles below Roseires. Here we heard them trumpeting and blowing water about one evening in January, but were unable to see the animals. They still frequent the Dinder River. In 1901, I. C. Johnson found them at Durraba and shot one near there. On our journey up this river we first found their tracks and droppings in the dry river bed above that place at a camp site, Mesharat el Kuka. The spoor was old, however. From this point on up the river to Um Orug, our farthest camp, there was abundance of old sign, and many broken trees twisted off by the huge beasts. A poaching party of Abyssinians had killed an Elephant here two or three months before and the herd had evidently left the region; possibly they had crossed over to the Rahad, or as some of the native hunters supposed, they may have retired to a *khôr* or dry water course to the south. The red-barked Acacia, whence the gum arabic is obtained, is the favorite food tree of the Elephants in this region. We constantly came upon large trees of this species, often eight inches in diameter at two or three feet from the ground and twenty-five or thirty feet high, that had been broken down and the topmost twigs eaten. They are broken in a rather characteristic manner, at about two or three feet from the ground, and the trunk partly twisted off. Others are broken over and uprooted, and the topmost twigs chewed.

PROCAVIA BUTLERI Wroughton.

Butler's Hyrax.

*Procapra butleri* Wroughton, Ann. mag. nat. hist., 1911, ser. 8, 8, p. 461.

The type of this species was obtained by Mr. A. L. Butler at Gebel Fazogli, one of the foothills of the Abyssinian highlands on the south side of the Blue Nile. Mr. Wroughton, in describing it, records a second specimen from Gebel Ain on the White Nile. During our stay at Fazogli we obtained three specimens and saw a few others. They live in dens among huge boulders and though somewhat shy, have a curious way of appearing suddenly at the openings of their retreats,

or frequently coming boldly out several feet from the entrance, where perched on a boulder they look about or give a characteristic sharp bark of two syllables at short intervals for some minutes at a time. Apparently they are much preyed upon by leopards and no doubt by other smaller Carnivora or predacious birds. Their habit of throwing aside all caution and bounding a few paces from their holes of a sudden is thus rather the more remarkable. At times, however, they show more concern for their safety, and if alarmed, will sit motionless at the opening of the den for many minutes at a time. Again they may be seen to run a long distance from rock to rock, and then dive into a crevice. When convinced that no danger is near they delight to bask in the sun during the early forenoon, but commonly retire at about 9:30 or 10 o'clock in the morning. On one occasion, however, I saw three running rapidly among the loose boulders at 1 p. m. On the rocks where they are accustomed to bask and particularly at the entrance to their dens, are usually to be seen large accumulations of their droppings. In addition to those from Gebel Fazogli, I found a considerable colony on a large isolated rock peak, Gebel Okalma. This is in appearance an old volcanic neck, projecting steeply and abruptly from the plain, several days' march from the nearest of the Abyssinian foothills from which it is separated by many miles of low country that would be utterly impassable for a Hyrax. The presence of these isolated colonies must therefore indicate that they have been long in the land, probably before the deposition of the *loess* that now covers the country. I could, nevertheless, detect no single character by which the Okalma specimens differed from those of Fazogli. No trace of these animals was to be found on a neighboring hill (Gebel Maba), which, however, was much less rocky, and afforded no suitable boulder heaps.

ARVICANTHIS TESTICULARIS (Sundevall).

Field Rat.

*Isomys testicularis* Sundevall, Kongl. Svenska vet.-acad. Handl., for 1842, 1843, p. 221.

This is the common Field Rat of the Blue Nile valley in the Sudan, and occurs generally throughout the country traversed from Sennar to Fazogli. Its favorite haunts are grassy fields, the borders of cultivated grounds, or the open scrub of bushes, weeds, and small palms. It is practically a diurnal species, and was several times seen running



about in the hotter parts of the day. The specimens trapped were all taken in early morning or before evening. Hawks catch many of them.

Sundevall's description was drawn from specimens collected on the White Nile by Hedenborg, and appears to apply well to the series from Sennar. The body measurements of adults are larger than he gives, however, for the average of three adults is:—head and body 163 mm., tail 149, foot 35, ear 19. Apparently *A. abyssinicus* does not occur west of the Abyssinian border. At all events, persistent trapping failed to discover it; nor did Lord Lovat's expedition across Abyssinia find it farther west than Sellen and Goodur in the high country at the head of the Blue Nile.

ACOMYS CINERACEUS Heuglin and Fitzinger.

Gray-footed Spiny Mouse.

*Acomys cineraceus* Heugl. and Fitzinger, Sitzb. Kön. akad. wiss. Wien, math.-nat. cl., 1867, 54, pt. 1, p. 573.

Two species of spiny mice were collected by the expedition. The one is a broad-footed, shorter-tailed animal, inhabiting all the low flat country of the Blue Nile Valley; the other is a slender-footed, longer-tailed species which we found only at Fazogli in the rocky hills which begin here at the Abyssinian border. The former I have referred to Heuglin's *A. cineraceus*; Heuglin's type locality is Doka, in eastern Sennar, between the Atbara and the Rahad Rivers. The original description is brief and refers to a figure previously published by Heuglin. In his "Reise" (1877), however, he gives a more detailed account, with measurements, which agree in all essentials with those of an immature specimen taken at Adreiba, a day's march above Roseires on the Blue Nile. We were fortunate in obtaining a second adult specimen, much farther down the river at El Mesharat. Apparently it is a widely distributed species but was difficult to obtain in the dry and barren plains over which we journeyed. There can be no doubt that Heuglin's type was an immature animal, having the entire dorsal area a smoky gray, paling slightly at the sides. The feet he states are marked with the same color on their outer portion. The measurements given are:—head and body 3'' 3''' (= 82.5 mm.), tail 2'' 6''' (= 69 mm.), ear 6''' (= 12.6 mm.). Our immature specimen measures:—head and body 78 mm., tail 67. The ratio of tail to head and

body is 83% in Heuglin's specimen, 85% in our immature individual. In the adult the tail is relatively shorter — 73%; and the measurements of the fresh specimen were:—head and body 112, tail 82, hind foot 18, ear 15. The entire dorsal region from nose to base of tail is smoke gray, becoming pale clay-color on the cheeks and sides of the body. The forearms and outer sides of the metacarpal and bases of the metatarsal areas are gray like the back, and the tail is similar above. The ventral surfaces, a spot below the eye, and at the base of the ear are white. Capt. Stanley S. Flower, of the Gizeh Zoölogical Gardens, generously presented an adult *Acomys* in alcohol taken June 19, 1912, at Eneikliba in Sennar Province, which is unquestionably the same animal. The short, broad hind feet and the relatively short tail (85 mm.) are equally characteristic.

In the *Novitates zoologicae*, (1901, 8, p. 400) de Winton describes as new, *Acomys witherbyi*, type from Kawa, south of Khartoum. He compares it with *A. nubicus* of Heuglin, from Middle Egypt, and mentions specimens from Shendi and Gebel Auli in the Nile Valley. It seems very close to *cineraceus*, with which it appears to agree in all essential characters, so far as the description goes. Possibly the two are identical, and *cineraceus* should apply to the *Acomys* of the level country of this part of the Nile Valley.

#### ACOMYS HUNTERI deWinton.

##### Hunter's Spiny Mouse.

*Acomys hunteri* de Winton, *Novitates zoologicae*, 1901, 8, p. 401, footnote.

Among the rock crevices of Gebel Fazogli, at the Abyssinian border, there occurred a second species of *Acomys*, which from descriptions alone, I am unable to differentiate from *hunteri*, the type of which came from the plains of Tokar, near Suakin, on the Red Sea. This is described as red fawn above, white beneath, which is practically as in an adult from Fazogli, except for the darker spines of the head and back. A younger individual is grayer dorsally, the sides pale ochraceous. The measurements given are:—head and body 105, tail 102, foot 17.5, ear 16. Our two specimens measure:—head and body 104, 101, tail 98, 96, foot 18, 19, ear 16, 16. It will be observed that the tail is about 94 or 95 (in the type 97) per cent of the length of head and body, hence much longer than in *cineraceus*. It differs strikingly also in its slenderer feet, which are pure white instead of darker.

The white spot at the base of the ear is not conspicuous. Compared with *A. kempi* from British East Africa, these specimens are only a trifle paler, and externally hardly to be distinguished. One specimen was taken in a trap placed on a leaning stump some three feet from the ground.

MUS (LEGGADA) TENELLA (Thomas).

Blue Nile Harvest Mouse.

*Leggada tenella* Thomas, Proc. Zool. soc. London, 1903, 1, p. 298.

Three specimens were preserved from Magangani and El Garef, both within a few miles of Roseires, the type locality. Two of the specimens are immature and much darker over the back than the other which is an adult. The type is said to have the fore legs entirely white, but in these two youngish specimens they are buffy like the sides of the body, and very pale buffy in the adult. The white spot at the outer base of the ear is very marked, whereas in the dark *L. bella* of British East Africa this spot is practically wanting.

Several other specimens were trapped along the Blue Nile at El Garef, Magangani, Bados, among the thorn bushes and tall grass canes, but they were nowhere common. The adult female measured:—total length 116 mm., tail 54, hind foot 13, ear from meatus 10.

EPIMYS MACROLEPIS (Sundevall).

Large-scaled Rat.

*Mus macrolepis* Sundevall, Kongl. Svenska vet.-acad. Handl., for 1842, 1843, p. 218.

The identity of Sundevall's *Mus macrolepis* is still a matter of some doubt, as indicated by Wroughton (1911, p. 460), and its author was himself uncertain whether or not it was the same as Rüppell's *Mus albipes*. The type locality of the former is Roseires, and there can be no doubt whatever, from Sundevall's careful description, that his *macrolepis* is the common ground rat which we found all along our journey from Sennar to Fazogli on the Blue Nile, and wherever we trapped on the Dinder River. The name is based on the fact that the caudal scales seemed large, five to 5 mm., but in our dried specimens there are six to 5 mm. No doubt Sundevall made the measurement from alcoholics. Until it can be shown, therefore, that *Mus*

*albipes* is identical with the Blue Nile rat, Sundevall's name may stand for it.

At El Garef we found a large colony of this rat among an open scrub growth of small dhoum palms, weeds, and bushes. They make well-worn runways from one clump of palms to another, or among the weed tangles, and live in holes dug in the ground in these shelters. They are apparently for the most part nocturnal.

The measurements of an adult male of *E. macrolepis* from Gabardi, beyond Singa, are:—head and body 142, tail 149, hind foot 24, ear 19. This is a very brightly colored specimen, with a buffy suffusion over the entire upper surface, and with a buffy line in the middle of the belly. The pure buffy tips of the hairs of the sides make a distinct stripe in this species, from the nose to the ankle, bounding the white of the belly.

Of *Epimys azrek*, a species of the multimammate group, the type of which also came from Roseires, we could find nothing. It may be at once distinguished by its smaller dimensions and by its pure white belly hairs, which latter in *macrolepis* are dark gray at their bases.

#### TATERA ROBUSTA (Cretzschmar).

##### Nile Valley Tufted-tailed Gerbille.

*Meriones robustus* Cretzschmar, Rüppell's Atlas reise nordlichen Afrika. Säugeth., 1826, p. 75, pl. 29, fig. b.

Wroughton (1906, p. 494) in his review of the members of this genus shows that Sundevall's *Meriones murinus* is probably the same as the *M. robustus* of Cretzschmar, the type of which is still in existence and is labeled "Ambukol, Nubien." The latter name Wroughton applies to the tufted-tailed gerbilles of the Nile Valley, and includes among his list of specimens in the British Museum, a single example from the Blue Nile, at Roseires, collected by Lord Lovat's expedition. We found this the common species all along the Blue Nile. It lives in tangled growth of grass, bushes, and small palms, the shelter of which it commonly shares with the native rat (*Epimys macrolepis*).

#### TATERA FLAVIPES, sp. nov.

##### Buff-footed Gerbille.

*Type*.—Skin and skull 14,491 M. C. Z., adult female, from Aradeiba, above Roseires, Blue Nile, Sudan. January 22, 1913.



*General Characters.*— Size large; tail as long as head and body, not tufted. Dark hairs prevailing dorsally; backs of hands and feet buff. Upper incisors grooved; pterygoids slightly expanded proximally, their bases extending forward anterior to the posterior median edge of the palate.

*Description.*— Top of head from nose to crown, nape, back, and dorsal surface of the tail a mixture of black and ochraceous buff, the former predominating. The individual hairs are slaty for the basal two thirds, then either black-tipped or with a subapical ring of ochraceous buff and a black tip; on the sides of the muzzle, cheeks, sides of body, forearms, and hind legs the black-tipped hairs become largely suppressed giving a nearly clear ochraceous buff (Ridgway, 1886) tone to these parts. Metacarpal and metatarsal areas clear buff, toes white. The ears are clothed with minute blackish hairs externally, and sparsely covered internally with short pale buff hairs. The entire ventral surface of the head and body (including the upper lips) and the limbs are covered with hairs white to their bases. The tail is sharply marked off by its ochraceous buff color on its basal half below; the rest of the under surface is darkened with short black hairs which predominate towards the tip. The terminal hairs are slightly the longest but do not form a tuft.

*Skull.*— The skull is that of a mature animal but the teeth are only slightly worn. In this condition the

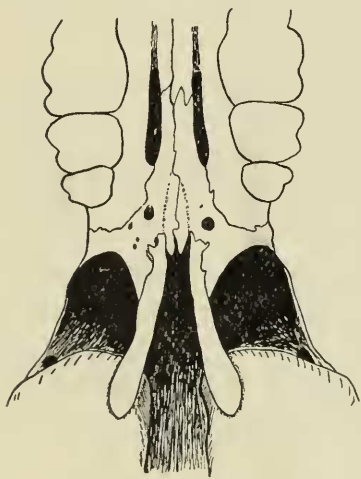


Fig. 2.— *Tatera flavipes*, palatal region.  $\times 3$ .

middle lamina of the first upper molar shows a slight central contraction marking off an inner and an outer portion. The upper incisors show a well-marked groove nearer the outer side, thus differing from the *liodon* group which this species equals in size. Anterior palatal foramina 3 mm. long, reaching from the level of the center of the first molar to the back of the second. Posterior palatal foramina reduced to two minute perforations just posterior to the level of the last molars. The conformation of the pterygoids is different from that of other species to which I have had access.

Their bases are slightly divergent, and included within a notch in the palatal bones between the median projecting point and the posterolateral extensions, which are rather

broader than in *T. robusta*. Distally the club-shaped end of the pterygoid is strongly in contact with the large audital bulla.

*Measurements*.— The type measured in the flesh:— head and body 171 mm., tail 172, hind foot 40.5, ear from meatus 23. Skull:— occipitonasal length 44, basal length 37.6, palatal length 24.4, nasals 17, zygomatic breadth 22.5, incisive foramina 8, audital bulla  $12.3 \times 7.2$ ; upper molar series (alveoli) 8, lower molar series (alveoli) 8, upper diastema 12.5.

*Remarks*.— This large species seemed rare as we obtained but the single specimen. It was trapped in grass and bushes on the edge of a native grain field. In Wroughton's key to this genus (1906), it would come under the second Section, "A. Tail not appreciably longer than head and body." It seems to show no very close relation to either *liodon* or *valida*, the two largest species of this section. Its large size, untufted tail equalling head and body, grooved upper incisors, dark dorsal area, buffy feet, and peculiar shape of the pterygoids are characteristic.

At Fazogli, on the south side of the Blue Nile we obtained a second species of *Tatera* with untufted tail, which likewise seems undescribed. It may be known as

TATERA SOROR, sp. nov.

Lesser Blue Nile Gerbille.

*Type*.— Skin and skull 14,492 M. C. Z., adult female, from Fazogli, Blue Nile, Sudan. January 16, 1913.

*General Characters*.— A smaller species, similar in general coloration to *T. flavipes* above described, but brighter ochraceous, feet white, tail longer than head and body, pterygoids narrowed basally, reaching the level of the hinder edge of the palate.

*Description*.— Top of head, nape, and median dorsal region the usual mixture of black and pale ochraceous buff, becoming clearer ochraceous buff on the sides where there is but slight admixture of black hairs. Compared with *flavipes* the ochraceous tint is brighter, but not so bright as in *mombasae* in which the head and nape are nearly clear, instead of being largely mixed with black. Fore and hind feet covered with short white hair. Area between the eye and ear paler, lower border of eye black. Ventral surface of head and body pure white to the roots of the hairs. Upper surface of tail thinly clothed with coarse, short, black hairs, not appreciably longer at the tip;

lower surface covered with short ochraceous buff hairs slightly paler on the distal half, and without admixture of black. Ears externally covered with black hairs, and minutely bordered with whitish.

Tail slightly longer than head and body, about 112%; hind foot shorter and stouter than in *T. mombasae*.

*Skull*.—The skull is that of a fully adult animal with teeth considerably worn. The anterior palatal vacuities do not extend quite to the level of the posterior edge of the second molar, and the posterior are present as rounded foramina larger than in *T. robusta*, beyond which the lateral extension of the palatal is very much more reduced. The pterygoids do not extend beyond the posterior median edge of the palate and are not expanded proximally. The nasal portion is relatively shorter than in *T. robusta*.

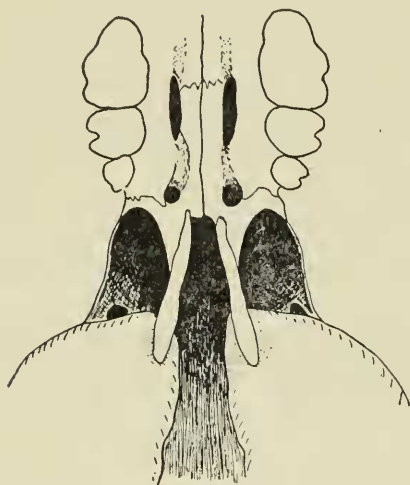


Fig. 3.—*Tatera soror*, palatal region.  
× 3.

*Measurements*.—The type measured in the flesh:—head and body 141 mm., tail 158, hind foot 34, ear from meatus 20. Skull:—occipitonasal length 38.5, basal length 32.5, palatal length 20, nasals 15.4,

zygomatic breadth 20.4, incisive foramina 6.6, audital bulla  $10 \times 6.5$ , upper molar series (alveoli) 7, lower molar series (alveoli) 6.3, upper diastema 10.1.

*Remarks*.—This small *Tatera* of the Blue Nile does not seem to resemble any of its geographically near allies. From the Abyssinian *T. shoana* it differs in its untufted tail, smaller size, and proportions. Compared with *T. mombasae* it is distinguishable at a glance by its shorter hind foot, less clear ochraceous coloring, and its tail which is proportionately shorter, coarser-haired, and differently colored.

The type was brought in by the natives at Fazogli near the Abyssinian border, and was said to have been caught in the tall grass of the alluvial plains. With it were its four young, about one third grown, which differ in color from the adult in being much darker above owing to the predominance of long black hairs; the sides are only slightly tinged with pale ochraceous buff, and the tail below is clear white to the tip, not ochraceous buff as in the adult. The discovery of these two additional species is of the greatest interest, as hitherto *Tatera*



*robusta*, a tufted-tailed species, was the only member of the genus known from this part of the Nile Valley.

GRAPHIURUS OROBINUS (Wagner).

Pigmy Dormouse.

*Myoxus orobinus* Wagner, Abh. Kön. Baier. akad. wiss., 1843, p. 149.

There is much doubt as to the identity of Wagner's *M. orobinus*, the type locality of which is Sennar. The original description is too brief to be of much avail, nor does Reuvers in his review of 1890, shed further light on the subject. The length of the body (=head and body) is given as 4''2''' or about 107 mm. We obtained five dormice on the Blue Nile, at El Garef and Magangani in traps set at the foot of thorn trees in scattered groves with vines and undergrowth. As no other species was met with, it may be that these represent *orobinus* though the largest is smaller than Wagner's measurement indicates. They are of the group to which *G. parvus* belongs, but rather pallid,—a brownish gray above, slightly clearer on the shoulders, black eye-rings nearly obsolete, tail pale drab; below whitish, with a tinge of buff. The gray bases of the hairs show through on the abdomen. The tail is not white-fringed. The measurements of two adult females (M. C. Z. 14,483, 14,486) are: — head and body 83, 88; tail 75, 71; hind foot 15, 17; ear from meatus 13.5, 12.5; greatest length of skull 25. It is not unlikely that Wagner's specimen was one of the larger browner group of dormice, and that ours is an undescribed race of the smaller group. Dollman's *Graphiurus butleri* seems to be a larger species; it was described from Jebel Ahmed Agar, on the White Nile below Fashoda.

EUXERUS ERYTHROPUS LEUCOUMBRINUS (Rüppell).

Side-striped Ground Squirrel.

*Sciurus leucoumbrinus* Rüppell, Neue wirbelth. fauna Abyssinien. Säugeth., 1835, p. 38.

We first saw this Squirrel between Sennar and Singa, and it was subsequently met with all along the Blue Nile to Fazogli where we obtained a young one, not more than a third grown, in late January. Heuglin states that these animals appear in early forenoon and late

afternoon foraging on the ground for food, but we found them about during the hottest hours of the day, running from clump to clump of scattered bushes or herbs, often stopping motionless to look about, and frequently making considerable journeys across open ground. Their holes were almost always found to have several openings close together, whether separate burrows or a common burrow was not ascertained. It was noticeable that the Squirrels were confined almost wholly to sandy soil, and were practically absent from the hard and sun-cracked "cotton soil." No doubt the latter is of too sticky a consistency in the wet season and so unsuitable for burrowing. Relatively fewer were seen on the Dinder than on the Blue Nile. In contrast to the ground squirrels of the genus *Xerus* seen in British East Africa, this species when running away in alarm or otherwise does not erect its tail at right angles to the body, but trails it inertly behind.

PARAXERUS sp.

Bush Squirrel.

This is an extremely rare Squirrel in the Blue Nile valley and seems to occur sparingly near the eastern portion along the Abyssinian border. We met with it but twice and unfortunately failed to secure specimens. A pair was seen in a leafy thorn tree a few miles from Fazogli and on Gebel Fazogli a single one feeding among the branches of a white-barked fig tree with thick green leaves, whose small berry-like fruits are eagerly eaten by many species of birds and by the fruit bats.

FELIS LEO ROOSEVELTI Heller.

Abyssinian Lion.

*Felis leo roosevelti* Heller, Smithsonian misc. coll., 1913, 61, no, 19, p. 2.

Lions are now rare on the Blue Nile. Indeed, the only place where we learned of them was at Omdurman, a small native village above Karkoj, where Dr. Phillips heard one. It was at this same place that I. C. Johnson in 1901, killed a lion; farther up at Soleil, he shot two others, and found more on the southerly bank of the river opposite Bados. Probably they have somewhat decreased in the twelve years intervening for we did not learn of their presence except at Omdurman. Possibly, also, there are more in this region during the rainy season.

On the upper Dinder River there are still a fair number of Lions, following the herds of antelope. They seem to kill a good many Giraffe as well. Shortly above Khor Galegu we once came out at midday upon the open dry river bed, and discovered an old lioness stalking a fine Waterbuck. She had crept unseen almost within striking distance by taking advantage of the slight inequalities of the sandy ground. One of her full grown cubs was only a short distance away near some sheltering bushes and nearer at hand were three others. The Lions sighted us and made off, leaving the buck unmolested. No doubt Lions are decreasing throughout this district.

Heller, in describing this race, refers to it a Sudanese specimen in the collection of the U. S. National Museum. The salient characters are the great breadth of the skull in combination with the small cheek-teeth.

#### FELIS PARDUS Linné.

##### Leopard.

*Felis pardus* Linné, Syst. nat., ed. 10, 1758, 1, p. 41.

We obtained no specimen of the Leopard, and are unable to assign the proper subspecific title to those observed. Leopards are not rare in the Blue Nile valley and on the Dinder, and their tracks were occasionally seen in the dusty trails. At Fazogli they were said to be present on the rocky hills, whence they sometimes descended by night to prowl about the native villages. No doubt they feed largely on the Hyraxes that live among the rocks. On the Dinder, Dr. Phillips came upon a company of monkeys scolding a Leopard among some thick bushes, but it bounded away at his approach. From its boldness and cunning as well as its ability to conceal itself in little cover, this will probably be about the last of the big cats to be driven from the country by the spread of settlements.

#### FELIS CAPENSIS PHILLIPSI, subsp. nov.

##### Phillips's Serval.

*Type*.—Adult male, skin and skeleton, 14,908 M. C. Z., from El Garef, Blue Nile, Sudan. January 10, 1913; Dr. John C. Phillips, collector.

*General Characters*.—A rather pale, short-tailed form, in which the body stripes are completely reduced to small spots.



*Description.*—General color of the dorsal surfaces “buff” (of Ridgway, 1886), a shade deeper along the middorsal line. On the forehead, cheeks, and feet are a few small black spots as usual in the servals. The nape is marked by the usual two pairs of black stripes, the outer of which is the broader (about 10 mm.) and runs from the inner base of the ear for about four fifths of the length of the neck beyond which point it breaks into a series of black spots. The inner pair is similar but one half as broad. On the shoulders all the stripes commonly present in the usual *serval* pattern are broken into elongated spots, the largest of which are some 50 mm. long by 10 wide. From the shoulders to the rump the body is uniformly spotted, without any semblance of a stripe posterior to the shoulders. These spots are arranged in more or less definite longitudinal rows, some fifteen in number at the middle region, and average about 10 to 15 mm. in diameter. The ear, as usual, is black on the terminal half with a whitish cross stripe which in the type extends practically across to the inner border. On the fore legs, a black band crosses the dorsal side below the elbow; while on their ventral surface there are two broad black bands. The ventral surface of the body and inside of the legs, chin, and upper throat are white except for the black markings. The lower throat is pale buff. A narrow black band crosses the throat between the angles of the jaws and a second about half the length of the throat. The tail is colored buff with seven black rings, the more basal of which are not quite complete ventrally; the tip is included within the seventh ring.

*Measurements.*—The measurements of the fresh specimen are:—head and body 792 mm., tail 290, hind foot 185, ear from meatus 90. Weight 21 pounds. The tail seems unusually short in this race, about 36% of the head-and-body length, against 46% in *hindei* and 43% in *kempfi* its nearest neighbors geographically. Skull.—Basal length 102 mm., palatal length 46, zygomatic breadth 78.5, interorbital constriction 22, mastoid width 46, upper cheek teeth (front of canine to back of molar) 38, lower cheek teeth (front of canine to back of sectorial) 42, width outside upper molars 45.5.

*Remarks.*—Wroughton (1910, p. 205) has shown that the name *Felis serval*, based on an Asiatic cat, if not unidentifiable, is at least untenable for an African species. He proposes to ignore the name in a technical sense, and adopts in its stead *Felis capensis* of Forster (1781) based on the *serval* of the Cape of Good Hope. He recognizes as valid races, *F. c. galeopardus* of Senegal and *F. c. togoensis* of Togoland and describes three new forms:—*F. c. hindei*, type locality, Machakos,



British East Africa, *F. c. kempfi*, type locality, Kirui, Elgon, and *F. c. beirae*, type locality, Beira, Portuguese East Africa. I have been able to make direct comparison with specimens in the Museum representing the races *galeopardus* and *hindei* but from a study of these and of Wroughton's descriptions it is clear that the *serval* of the dry flat country of the Blue Nile Valley is distinct from them all. It appears to be very much paler than *kempfi* of the Elgon district and *hindei* of British East Africa, and represents to an extreme degree the reduction of the striped pattern to one entirely of spots on the body. The shortness of the tail and its color-pattern are also noteworthy.

It is a pleasure to associate this fine cat with the name of Dr. John C. Phillips, to whose enthusiasm and generosity the present collection is due. The type specimen was trapped by him in a scattered growth of thorn trees on the outskirts of the native village of El Garef.

#### LYNX CARACAL NUBICA (Fitzinger).

##### Sudan Caracal.

*Caracal nubicus* Fitzinger, Sitzb. Kön. akad. wiss. Wien, math.-nat. cl., 1869, 60, pt. 1, p. 205.

The Caracal is apparently uncommon in the region traversed. There are specimens living in the Zoölogical Gardens at Gizeh, that were caught on the Blue Nile, and we trapped an immature specimen at Magangani a few miles below Roseires. It had come to the bait in the late afternoon within a short distance of our camp.

#### MUNGOS ALBICAUDUS ALBESCENS (Geoffroy).

##### White-tailed Mongoose.

*Herpestes albescens* Geoffroy, Rev. et mag. zool., 1839, p. 16.

This was the only Mongoose we met with. Specimens were obtained on the Blue Nile and on the Dinder River. It seemed to be one of the commonest of the smaller Carnivora. Although the smaller species of mongoose are active by day, this species apparently is nocturnal. At a camp a few miles above Roseires, one came to a trap within a few yards of the tent in the early evening, doubtless the same animal that succeeded in stealing the bait from a trap even nearer the preceding evening. At Magangani, on visiting the traps

shortly after dawn, one was found already dead having been bitten through the neck by a leopard whose tracks were seen in the path. On another occasion we startled one in the early afternoon, that had been ensconced in the hollow under the roots of a fallen tree, no doubt asleep.

GENETTA ABYSSINICA (Rüppell).

Abyssinian Civet-cat.

*Viverra abyssinica* Rüppell, Neue wirbelth. fauna Abyssinien. Säugeth. 1835, p. 33, pl. 11.

Along the Blue Nile and the Dinder River this seemed to be a common species. Specimens were trapped at Bados and Magangani on the Blue Nile and at the latter spot Dr. Phillips shot one that was clambering up the trunk of a large baobad tree in the full sunlight of noon. At Bados, one was caught in a trap and found next morning partly eaten by a large cat, apparently a Caracal, that bounded off in the dusk when surprised. Curiously, we did not succeed in trapping any in the more northern part of our journey between Sennar and Bados, where perhaps they are less common.

The extraordinary amount of color variation in this group renders the division into races a matter of much uncertainty. Professor Matschie (1902) in his review of the civet-cats, was able to examine some 240 skins in the Berlin Zoölogical Museum, and recognized no less than thirty-three forms, all of which may be considered races of two species, the one with a longer-haired, the other with a shorter-haired tail. In the latter group belong the specimens obtained by the Phillips Expedition. Although the propriety of recognizing so many local races may be questioned and the value of certain of the characters considered distinctive is yet to be shown, the four skins preserved do agree in having the light tail annulations much wider than the dark, and the feet practically of the same light gray on both the superior and the inferior surfaces, marks which Matschie finds distinctive of the civet-cats of the Red Sea coast (*G. schraderi* from Massawa) and the present species, described by Rüppell from between Kordofan and Gondar in Abyssinia. As these specimens are practically topotypes of *abyssinica*, a brief statement of the variation in color is of interest. This is mainly a matter of the relative amounts of black, rusty, and buff in the pattern, and the degree to which the rows of spots coalesce to form stripes. In two specimens, the ground color

is uniformly pale buff; the two dorsal rows of spots on each side are much larger in one than in the other and prevailing rusty in color. The median stripe is likewise more rusty than black. In the other two skins, the ground color is clearer gray, the dorsal rows of spots in one case rusty in the other more black than rusty, and the dorsal stripe black. In all, the two terminal light rings on the tail are incomplete dorsally owing to the median black portion connecting the three last dark rings. The stripes and rows of spots vary even on opposite sides of the body. The spots in the row nearest the midline on each side show a marked tendency to run together into a stripe over the hips. The outer stripe from the nape to the shoulder, in one individual is broken into a series of elongated spots. The pale annulations of the tail in all are white ventrally shading rather abruptly into buff on the dorsal side. At the ankle, posteriorly the dark spot is rather ill defined and restricted. All the three males in the series are more buff than the single female, but the latter is practically identical with one of the males. Both are from Magangani, some ten miles below Roseires on the Blue Nile, whereas the two buffer specimens, with rusty spots and median stripe are from the Dinder River at Kuka and Ereif el Dik respectively.

#### HYAENA HIENOMELAS Matschie.

##### Nubian Striped Hyæna.

*Hyæna hienomelas* Matschie, Sitzb. Ges. naturf. freunde Berlin, 1900, p. 53.

The Striped Hyæna of the Atbara and neighboring region is considered distinct by Matschie in his revision of the species. He calls it *H. hienomelas*, and quotes Latreille (Sonnini's Suites de Buffon, 27, p. 25) as the authority. Latreille, however, did not give a Latin designation to this species, but refers to a specimen in the Paris Museum as having been called by Lacépède *chien hiénomelas*. He further quotes Bruce's account of its habits in the Sudan. The Latin name must then apparently be credited to Matschie. We trapped a specimen at Magangani and several times heard them about our camps along the Blue Nile. What I took to be their cry is different from that of the Spotted Hyæna, having a more musical quality with a rising then a falling inflection.

## ICTONYX ERYTHRAEA de Winton.

## Red Sea Striped Weasel.

*Ictonyx erythraea* (sic) de Winton, Ann. mag. nat. hist., 1898, ser. 7, 1, p. 248.

The type locality of this species is Suakin on the Red Sea coast, and its describer considers that a specimen from Somaliland represents the same form. A male collected by Mr. A. L. Butler at Roseires on the Blue Nile is also referred to this species by Wroughton (1911, p. 459). Two specimens were taken by our expedition — at Gabardi and El Garef respectively, localities between Singa and Roseires.

## ERINACEUS ALBIVENTRIS PRUNERI Wagner.

## White-bellied Hedgehog.

*Erinaceus pruneri* Wagner, Schreber's Säugeth. suppl., 1841, 2, p. 23.

Although apparently not uncommon, Hedgehogs were hard to obtain. A live one was brought in by the natives at Fazogli who said they occasionally came upon them, or found them hidden in hollow logs or tree trunks. The dried spiny portion of the skin is sometimes found, as if left by some animal that had eaten the rest.

This species belongs to the group for which Pomel in 1848 proposed the generic name *Atelerix*, type species *pruneri*. Fitzinger in 1867 gave the name *Peroëchinus* to the same group of small hedgehogs that lack the first hind toe. In the specimen from Fazogli the toes are very short, hardly separate from the pad. The claw of posterior digit 2 is largest, curved, and flattened. The remaining claws of the hind foot are successively smaller, that of the third digit rather flattened, those of the fourth and fifth compressed laterally. The face from nose to between the eyes is thinly covered with short dark brown hairs, and in life the skin is blackish. The hair of the forehead, cheeks, and ventral surfaces is dull white, mixed on the ears, legs, and tail with brown. This coloration separates it from the Senegambian *albiventris* of which it is made a subspecies by Anderson and de Winton in their Mammalia of Egypt. The spines are blackish, with white tips, and a few along the sides are white throughout.

We found nothing of the species *senaarensis* described from Sennar Province. It belongs to the group of larger species with five well-developed claws on the hind foot. According to Anderson and



de Winton the locality "Senaar" is very doubtful, and it is probable that the name is a synonym of *E. aethiopicus* of lower Egypt.

### CROCIDURA SERICEA (Sundevall).

#### Silky Shrew.

*Sorex sericeus* Sundevall, ex Hedenborg MS., Kongl. Svenska vet.-acad. Handl. for 1842, 1843, p. 173.

In his essay on the genus *Sorex* above cited, Sundevall in 1843 described three new *Crocідuras* from Sennar and the White Nile on the basis of specimens sent by Hedenborg, the Swedish traveller. The first of these, *Sorex* (= *Crocідura*) *hedenborgianus*, is characterized as a rather large species, head and body 140 mm., tail 52, skull 31 mm. long, of a uniform chocolate-brown above and below. We found nothing of this animal. The second species *S.* (= *C.*) *fulvaster* is said to be pale grayish brown above, ashy white below, the tail about half the length of head and body. The single specimen came from the White Nile, and measured:—head and body 90 mm., tail 44, skull 21 mm. long and 5 mm. between the orbits. The third species *S.* (= *C.*) *sericeus* is reddish brown above, beneath ashy, with a tail slightly more than half the length of head and body. The skull is 22 mm. long. For this animal the name *sericeus* is proposed, with Hedenborg as authority, but the latter merely suggested the name in a manuscript catalogue of the collection.

Two specimens taken on the Blue Nile some ten miles above Karkoj and a third from Kuka, a camp site on the Dinder River, agree very closely with Sundevall's description of *sericeus* and undoubtedly represent that animal. The measurements of the three are:—

No.	Head and body.	Tail.	Hind Foot.	Ear.
14,447	87	53	12	—
14,448	90	60	13	8
14,449	95	58	14	9.5
Type	90	49	14	

The skull of the type was 22 mm. long, interorbital breadth 4.5, breadth of rostrum 2.5. These measurements are practically the same in our specimens. *C. fulvastra* is said to have a trifle shorter but actually broader skull.

All three specimens were caught among dry grass and weeds, two

at a distance of several miles from the nearest water, the third near the course of the Dinder then largely dried up. This last specimen is appreciably darker in color, less brown, than the two from the Blue Nile. The type locality is Sennar Province on the White Nile.

EPOMOPHORUS LABIATUS (Temminck).

Large-lipped Fruit Bat.

*Pteropus labiatus* Temminck, Monogr. mammalogie, 1835-41, 2, p. 83, pl. 39, fig. 1-3.

At Fazogli on the Blue Nile, and at Um Orug on the upper Dinder River, fruit bats came nightly to feed on the berry-like fruit of a large fig tree with thick green leaves that grew by the river's brink. Numbers of them were visible in the moonlight darting about, hovering momentarily to feed, or apparently alighting here and there in order to obtain the berries. A curious hoarse squeak was frequently uttered as they flew about. Of three specimens secured, one female proves to be of this species. Wroughton has also recorded a specimen taken at Gebel Maba, 25 miles south of Roseires, and Andersen notes two males from Roseires in the British Museum. According to this author (1912, p. 531) Sennar is the type locality, not "Abyssinia" as given by Temminck.

EPOMOPHORUS ANURUS Heuglin.

Heuglin's Fruit Bat.

*Epomophorus anurus* Heuglin, Nova acta Acad. Leop. Carol., 1864, 31, art. 7, p. 12.

An adult male and a female were taken at Fazogli. Andersen (1912) shows that in this species the males are much larger than the females, whereas in *E. labiatus* there is practically no such disparity between the sexes. The females of the two species however, in their extremes, closely approach each other. This author gives the range as from Erythrea and Abyssinia to British and German East Africa, Uganda and Bahr-el-Ghazal. Its occurrence in eastern Sennar is therefore of interest, and perhaps not unexpected.

An immature specimen of the Egyptian Rousette Bat (*Eidolon helvum*) without skull, is recorded by Wroughton (1911, p. 458) as sent to the British Museum from Roseires, by Mr. A. L. Butler. We did not meet with the species.

## LAVIA FRONS AFFINIS Andersen and Wroughton.

## Northern Big-eared Bat.

*Lavia frons affinis* Andersen and Wroughton, Ann. mag. nat. hist., 1907, ser. 7, 19, p. 140.

Specimens of this bat were obtained at Singa and Abu Zor on the Blue Nile, and at El Abiad on the Dinder. De Winton (1900) records it also from Roseires. No doubt it is one of the common species and widely distributed. Compared with a series of skins from British East Africa (Guaso Nyiro) representing *L. frons frons* those from the Sudan are decidedly smaller (forearms 56–61 mm., as against 62–63) and paler in color. Two males differ from any of the East African specimens in the color of the fur on the rump which shades into olive-green and forms a distinct patch at the posterior end of the body, contrasting with the pearly gray of the rest of the coat. At Singa, December 28, 1912, two, a male and female, were found hanging in the branches of a thin mimosa tree where it was still shady in the early forenoon. They hung one atop of the other and were possibly a mated pair. At other times they are frequently disturbed among thick bushes or vines in the daytime and ever alert, fly to a new covert when approached. Their habits during their periods of activity we could never observe. None were ever identified or shot in the evening when other species were collected. At El Abiad, however, just before dawn I noticed several flying about a large thorn tree above our tent and finally coming to rest in its upper twigs as the daylight came on. The shelter was so thin, that had they been undisturbed, they would doubtless have quitted it later for some thick vines near at hand. The dull orange-yellow of the membranes soon fades out in the preserved specimen.

## RHINOLOPHUS DOBSONI Thomas.

## Dobson's Leaf-nosed Bat.

*Rhinolophus clivosus* Dobson, Cat. Chiropt. Brit. mus., 1878, p. 120 (*nec* Rüppell).

*Rhinolophus dobsoni* Thomas, Ann. mag. nat. hist., 1904, ser. 4, 14, p. 156.

Thomas has shown that the alcoholic specimens from which Dobson drew his description of *R. clivosus*, were not that species but belong

to the group in which the anterior upper premolar stands in the tooth-row, between the second premolar and the canine. The color as described by Dobson — "sulphur-brown above, beneath canary colour" — he considers perhaps due to faulty preservation. The type locality is Kordofan.

Four skins and eleven alcoholics from Abu Zor on the Blue Nile agree structurally in all particulars with *dobsoni* and undoubtedly are referable to that species. The slight narrowing of the vertical process of the sella at its middle and the high blunt tip of the connecting process are characteristic. The forearm measurement of the type is given as 44 mm., and in our series varies between 42 and 44.5 mm. The color is a smoky or smoky drab above and clear drab below, so that the yellowish tint observed by Dobson is doubtless, as Mr. Thomas suggests, a result of poor preservation. As no cranial measurements are published, the following are appended: — skull, (14,471 M. C. Z.) greatest length 18 mm.; palatal length 6; zygomatic breadth 9.5; mastoid breadth 9; upper tooth row to front of canine 6.8; lower tooth row to front of canine 7.

All our specimens were from a single large colony that inhabited the dark interior of a hollow baobab tree. A huge limb had broken off making a hole about two feet in diameter by means of which access was gained to the interior. The hollow trunk was about ten feet in diameter and the main colony of bats was resting in the upper part of its dark interior. Many, disturbed by my presence flew around and around within the great cavity but did not attempt to pass out into the daylight. A faint chippering note was frequently given as they flew about. All but three of the fifteen preserved proved to be females.

The British Museum has a specimen of *Rhinolophus hipposideros minimus* from Sennar, but we did not meet with the species (Andersen, Ann. mag. nat. hist., 1904, ser. 7, 14, p. 455).

#### RHINOLOPHUS ACROTIS Heuglin.

##### Sharp-eared Leaf-nosed Bat.

*Rhinolophus acrotis* Heuglin, Nova acta Acad. Leop. Carol., 1861, 29, art. 15, p. 10; Andersen, Ann. mag. nat. hist., 1904, ser. 7, 14, p. 454.

At Magangani, about ten miles below Roseires on the Blue Nile, a solitary leaf-nosed bat was found hanging inside a hollow baobab tree. It was a male and apparently represents Heuglin's species, the type



of which was from Keren, Erythrea. In contrast to the tree inhabited by the Dobson's Leaf-nosed Bats, this was well lighted by two large openings in the massive trunk, and the bat hung in the shade against the inner wall. The forearm measurement is 48, which as Andersen points out, is slightly greater than in the race *andersoni* from the eastern desert region of Egypt. The skull is decidedly longer, 21.2 mm. from occiput to front of canine instead of 19, but the lower tooth row, back of last molar to front of canine, measures the same in both, 8.3 mm. In all four specimens of *R. a. andersoni* examined by Thomas, the minute anterior premolars, (considered by Andersen to be  $p^2$  and  $p_3$  in upper and lower jaws respectively), were quite lacking and the same is true of the type and topotype of *R. acrotis* according to Andersen. In the specimen from Magangani, however, the minute  $p^2$  of the upper right-hand series is present as a mere spicule in the outer angle between the canine and the large premolar. In the related *R. clivosus* the small anterior premolars are said to be present.

Peters, in 1859, described a species of *Rhinopoma* from the Blue Nile, but no specimens seem to have been recorded in more recent times. Heuglin and Fitzinger also name a species of this genus from Sennar, but it may be that the generic reference was erroneous. We did not find the genus except in Egypt where it is well known.

#### PIPISTRELLUS MARGINATUS (Cretzschmar).

##### Marginated Pipistrelle.

*Vespertilio marginatus* Cretzschmar, Rüppell's Atlas reise nördlichen Afrika. Säugeth., 1826, p. 74, pl. 29, fig. a.

But a single *Pipistrellus* was obtained, an adult female at El Garef, on the Blue Nile. It was knocked down with a stick as it flew past near the ground. In general appearance it much resembles *P. kuhli* of Europe, not only in color of the fur but in having a dull whitish border to the interfemoral membrane. It is smaller, however, with a forearm of only 30 mm., against 35 in specimens of *kuhli* from Italy, with which I have compared it. In color and size it differs from *P. kuhli fuscatus* described by Thomas from Naivasha, British East Africa, but appears to be identical with Cretzschmar's *Vespertilio marginatus*, currently placed as a synonym of *P. kuhli*. The forearm of *marginatus* measures 30 mm. in Cretzschmar's plate, and so agrees

with our specimen, which in lack of evidence to the contrary, may stand for the present as a full species. The subspecies *fuscatus* is described as dark smoky brown above, scarcely lighter below and without a white edging to the membrane, so is a very different animal. The inner upper incisor in *P. marginatus* is strongly bifid, and about twice the height of the outer. The first upper premolar is minute, not exceeding the cingulum of the canine, hence is invisible externally. It is not present on the left side of our specimen. The greatest length of the skull is 11.8 mm., of the tooth row, back of upper third molar to front of canine 4.

EPTESICUS PHASMA G. M. Allen.

Ghost Bat.

*Eptesicus phasma* G. M. Allen, Bull. Mus. comp. zool., 1911, 54, p. 327.

Five specimens of this white-winged species were collected at various points along the Blue Nile (Roseires, El Garef, Magangani) where it appeared to be fairly common. It commences to fly at dusk, and usually keeps fairly low, even coming close to the ground. More than once I knocked one down with a stick as it flew near me.

I have compared the specimens with the original series from British East Africa and do not find them essentially different.

EPTESICUS MINUTUS SOMALICUS (Thomas).

Northern Little Brown Bat.

*Vespertilio minutus somalicus* Thomas, Ann. mag. nat. hist., 1901, ser. 7, 8, p. 32.

A single specimen of this species was obtained at Bados on the Blue Nile, as it was flying about at the edge of a great marsh at dusk. Although in its present condition it is impossible to be certain of its color, it seems less pallid below than Thomas describes for the type from Somaliland; the interfemoral membrane is prominently edged with whitish, which is given as one of the characters separating it from typical *minutus* of South Africa.

## SCOTEINUS SCHLIEFFENI (Peters).

## Schlieffen's Bat.

*Nycticejus schlieffenii* Peters, Monatsb. Kön. preuss. akad. wiss., 1859, p. 224.

Dr. Phillips shot an adult male of this bat at Bados, on the Blue Nile. It was flying about at the edge of a broad marsh just at dusk. In common with *Scotoecus*, it has a large penial bone, 12 mm. long in this specimen, clothed with very short whitish hairs directed basally. Dobson mentions a specimen in which a minute first upper premolar was present on one side only, and another in which this tooth was found on both sides. Our specimen presents a similar anomaly in possessing this extra premolar on both sides, wedged in the angle between the canine and the large premolar. The wings seem relatively short, due apparently to the short third finger which but little exceeds the fourth.

The type specimen of this bat came from Cairo, Egypt. Later writers persistently misspell the specific name, by omitting an "f."

## SCOTOPHILUS NIGRITA LEUCOGASTER (Cretzschmar).

## White-bellied Brown Bat.

*Nycticejus leucogaster* Cretzschmar, Rüppell's Atlas reise in nördlichen Afrika. Säugeth., 1826, p. 71, pl. 28, fig. a.

This large species is common throughout most of the African continent and has been subdivided into several races. Thomas (Ann. mag. nat. hist., 1904, ser. 7, 13, p. 208) states that Cretzschmar's name is applicable to the Abyssinian form, though Kordofan is the type locality. True *nigrita* of West Africa, Senegal, is larger, with forearm, as measured on Schreber's plate, 57 mm.

We obtained specimens at Magangani and at Fazogli on the Blue Nile. They appear shortly after sunset while it is yet light, and are among the first bats flying. Their flight is straightforward, fairly steady and not so swift as that of the *Chaerephons*, and they commonly are at an elevation of 30 or 40 feet. During the daytime they rest in hollow trees (Cretzschmar). Most of those obtained were excessively fat. The color above is an olive-brown, distinctly darker on the crown and nape, where in one specimen at least, there are a few minute white flecks, and the tips of the hairs are minutely white,



giving a frosted appearance. This specimen has a small white spot in the middle of the lower back. The fur of the lower surface is dull white to the roots of the hairs. The forearm measurement is 51–52 mm. The extreme length of the skull (occiput to incisors) is 20.5 mm.

SCOTOPHILUS ALTILIS, sp. nov.

Lesser Brown Bat.

*Type*.—Adult male, skin and skull, 14,463 M. C. Z., from Ara-deiba, above Roseires, Blue Nile, Sudan. 22 January, 1913.

*General Characters*.—A small species, forearm 46 mm., grayish brown above; chin and throat white, chest and belly pale drab.

*Description*.—In contrast to the previous species, this is a grayish or yellowish brown above; crown only slightly darker, marked in the type by two fine streaks of white due to the confluence of the fine white tips which many of the hairs of the nape and crown show, and which give a slightly frosted appearance to this region. Chin practically naked, its skin dark-pigmented. Hair of the throat and groin silky white to the base; chest and abdomen pale drab to the roots of the hairs. Membranes naked above, but below a sparse covering of white hairs extends out as far on the wings as a line joining the elbow and the middle of the femur. A line of fine whitish hairs extends along the outer side of the forearm to the carpus. Postcalcanal lobe well developed.

*Skull*.—The skull resembles in general that of *S. n. leucogaster* but is much smaller, with a less prominent occipital crest, the upper incisors are slightly more inturned, and the median spine at the posterior margin of the palate is relatively more developed.

*Measurements*.—The type measured:—total length 116 mm., tail 50, hind foot 8, ear from meatus 16, tibia 20.5, forearm 46. The skull:—greatest length (occiput to tip of incisor) 18.2, basal length (basion to tip of incisor) 15, median palatal length 6, zygomatic width 12.8, lacrymal width 7.5, mastoid width 11, upper tooth row (exclusive of incisor) 6.1, lower tooth row (exclusive of incisors) 7.

*Remarks*.—Throughout Africa, south of the Sahara two species of *Scotophilus*, a larger and a smaller, seem to occur together. The larger is *S. nigrata* represented by the following races:—*S. n. nigrata* (Schreber) from Senegal; *S. n. nux* Thomas from the Cameroons; *S. n. herero* Thomas from northern Damaraland; *S. n. dingani* (Smith) from South Africa; *S. n. planirostris* (Peters) from Mozam-



bique; *S. n. colias* Thomas, from British East Africa; and *S. n. leucogaster* (Cretzschmar) from Northeast Africa. The status of *S. borbonicus* I do not know. In these forms the forearm is large, from 51 to 57 mm. The smaller species seems to have corresponding geographic races, but their relationships are not yet settled. To this group belong apparently *S. nigritellus* de Winton, a small species from the Gold Coast, forearm 44.5 mm.; *S. damarensis* Thomas, a larger form from Damaraland, forearm 48 mm., *S. viridis* (Peters) of Mozambique, forearm 46, olive-green above, greenish yellow below; and *S. altilis* here described, which is at once distinguished by its size and color from these.

In addition to the type, specimens were taken at Bados, El Serifa, and Fazogli along the Blue Nile. Their flight and appearance was as in the larger species, and they were similarly fat, whence the Latin designation.

#### CHAEREPHON MIDAS (Sundevall).

##### Hedenborg's Free-tailed Bat.

*Dysopes midas* Sundevall, Kongl. Svenska vet.-acad. Handl. for 1842, 1843, p. 207, pl. 2, fig. 7, a-e.

De Winton (1901) in his review of the Nyctinomi of Africa, redescribed this species on the basis of an imperfect cotype in the British Museum. Sundevall received several specimens taken in the Acacia trees on islands of the White Nile by Hedenborg, who suggested the name in a note sent with them. The original description is clear and points out the characters separating it from "*D. cestoni*" (= *C. taeniotis*) of Europe; the skull is figured of natural size, showing the great breadth of the braincase and the narrow rostrum. We obtained a single specimen at Fazogli, near the Abyssinian border, from a native who had caught it in a hollow tree. The general color above is chocolate, with a grayish suffusion due to the pale tips of the hairs. Below, these pale tips are more extensive, giving a hoary appearance. A narrow line of whitish hairs extends from the elbow along the outer side of the forearm to the carpus. De Winton describes the skull in a male as having a "very high keel-like sagittal crest raised above the forehead from between the eyes" but in our female this crest is barely indicated. The forearm measured 61 mm.; Sundevall gives 60 mm. The skull measures:—greatest length 25.5 mm., palatal length 11, zygomatic breadth 15; breadth outside last molars 11; interorbital constriction 5; upper tooth row excluding incisors 10, lower tooth row excluding incisors 11.1.

## CHAEREPHON EMINI (de Winton).

## Emin's Free-tailed Bat.

*Nyctinomus emini* de Winton, Ann. mag. nat. hist., 1901, ser. 7, 7, p. 40.

Wroughton (1911) has recorded this species from Roseires, on the Blue Nile, where a single male was taken by Mr. A. L. Butler. We collected a specimen not far from the same locality, at Aradeiba, which seems to be the same species, though differing from the type as described by de Winton in that the first upper premolar is crowded slightly to the exterior of the line of the tooth row instead of standing directly in it. The lower incisors are markedly bifurcate in this specimen in addition. The color above is a very grayish brown rather than reddish brown; the throat hairs are pure white to their bases, and this color extends down the midventral line. The hair at the elbow and thence along the sides to the groin is not white but more like that of the sides of the body — a variation similar to that seen in this area of *C. pumilus*. The forearm measures 42 mm.; that of the type specimen from Mosambi, 43 mm. The skull measures: — greatest length 19 mm., palatal length 8.2; width outside last molars 9.5; zygomatic width 12.7; interorbital constriction 4; upper tooth row excluding incisors 7.5; lower tooth row excluding incisors 8.5.

## CHAEREPHON BIVITTATUS (Heuglin).

## Gray-streaked Free-tailed Bat.

*Nyctinomus bivittatus* Heuglin, Nova acta Acad. Leop. Carol., 1861, 29, art. 8, p. 13.

Two large heavy-bodied bats from El Garef on the Blue Nile, seem to represent Heuglin's species, though the forearm measurement (42, 44 mm.) seems rather smaller than that given by the describer (1 inch 10 lines = 46.4 mm.). Heuglin's specimens were from Keren, in north-central Erythrea. The color above is very dark brown with a minute frosting of gray, and with scattered specks or streaks of whitish, on the nape, shoulders, and back; below, the fur is grayish, darker on the sides, and clearer on the lower throat. The two specimens were very fat and heavy bodied. They were flying shortly after sunset, going in a rather steady slow course, in comparison with the smaller species. Compared with *C. emini*, which it approximates in

size, the skull is longer, with a larger rounder braincase, which is less markedly truncate at the lambdoid crest, in contrast to that of *emini* which is almost squarely truncate in posterior outline. In *C. pumilus* the lambdoid ridges are not transverse but are directed slightly forward so that they do not form the posterior boundary of the skull as in these two species, and the supraoccipital is not hidden by them in dorsal view. The skull of *C. bivittatus* (no. 14,456) measures:—greatest length 21 mm., palatal length 8.5, zygomatic breadth 12.5, width outside last molars 9.1, interorbital constriction 4.2, upper tooth row excluding incisors 7.5, lower tooth row excluding incisors 8.

In one of the two specimens, the minute first upper premolar is nearly in the tooth row, but very slightly exterior to the posterior heel of the canine; in the other the same tooth is entirely external to the tooth row and placed in the external angle between the canine and the second premolar, which are actually in contact on each side. Somewhat similar variation has just been noted in case of *C. emini*, and is evidently an expression of the tendency toward shortening the tooth row through the displacement and eventual loss of the minute first premolar.

CHAEREPHON PUMILUS (Cretzschmar).

Lesser Free-tailed Bat.

*Dysopes pumilus* Cretzschmar, Rüppell's Atlas reise nördlichen Afrika. Säugeth., 1826, p. 69, pl. 27, fig. a.

Several specimens of this bat were obtained along the Blue Nile at El Garef and Magangani where they seemed to be common. They appeared shortly after dusk, flew rather high and swiftly. This species is dichromatic and presents a russet and a blackish or dark chocolate-brown phase. The former condition seems to be due to a lack of the blackish pigment in the hairs; the latter to the mixture of the reddish and the blackish pigments which commonly coexist in the pelage. The extreme tips of the hairs are pale, giving a faintly hoary aspect to the back. The lower surfaces are paler than the upper and along the sides of the body from the axilla to the groin is a pale, almost whitish band of fur on the wing-membranes, that contrasts with the darker sides of the body. These details of color have not heretofore been described, no doubt because they are not very apparent in alcoholic specimens. The original description was based on a specimen from the Red Sea coast at Massowa, collected by Rüppell. The forearms of the five specimens obtained measure from 35.5 to 37.5 mm.,



hence a trifle smaller than what de Winton (1901) gives (38 mm.) in his review of the African Nyctinomi. Other dimensions are: — total length 87–91 mm., tail 31.5–34; hind foot 6.8–7; ear from meatus 13–15. The skull of an adult male (14,460) measures:— greatest length, 16.5 mm.; palatal length 7; zygomatic breadth 10; interorbital constriction 4; upper tooth row exclusive of incisors 6; lower tooth row exclusive of incisors 6.6.

GALAGO SENNAARIENSIS Lesson.

Nile Valley Galago.

*Galago acaciarum* var. *G. sennaariensis* Lesson, Spec. mamm., 1840, p. 248.

Elliot in his Review of the Primates considers Sundevall's *Otolincus teng* of the White Nile a synonym of this species. On the Blue Nile it appears to be rare, but this is no doubt due in part to its retiring habits. At Roseires we were shown one that had been caught by a native soldier in gathering fuel among the larger trees near there. A female from the same locality was living in the Zoölogical Gardens at Gizeh. Shortly after its arrival she had given birth to a young one.

ERYTHROCEBUS PYRRHONOTUS (Hemprich and Ehrenberg).

Hussar Monkey.

*Cercopithecus pyrrhonotus* Hempr. and Ehrenb., Symb. phys., 1838, pl. 10.

Although troops of these monkeys are said to be frequently seen on the Blue Nile and the Dinder, south of Singa, we met with them but once, near Gozar on the latter river, where Dr. Phillips came upon two companies of them near the stream at midday. They rushed off over the level ground and in a moment had disappeared among the scattered thorn trees.

It is worth noting that we met with no baboons, even among the rocky foothills of the Abyssinian border near Fazogli. In the Zoölogical Gardens at Gizeh, however, were some splendid specimens of the dark-colored Anubis Baboon said to be from the Blue Nile. At the mouth of the Dinder, where it meets the Blue Nile some forty miles to the south of Wad Medani, is said to be a favorite resort for baboons. In his book, *Sport on the Blue Nile*, (1903, p. 46) I. C. Johnson mentions seeing great numbers at this point, but farther south they



seem to be rare or altogether absent. Rothschild calls the Blue Nile Baboon *Papio lydekkeri*, but Elliot places this as a *nomen nudum* under *P. cynocephalus*.

LASIOPYGA GRISEOVIRIDIS (Desmarest).

Grivet Monkey.

*Cercopithecus griseoviridis* Desmarest, Mammalogie, 1820, 1, p. 61.

The first monkeys seen were near El Mesharat two or three days' journey up the Blue Nile from Singa. From this point to the Abyssinian border we saw them frequently, usually in small troops of old and young in the large leafy 'sont' trees near the river. At Abu Zor they were rather tame, coming freely into the great trees above the Government rest house, but elsewhere they were shy and commonly took to flight on seeing us approach. They appeared well aware of the fact that the scattered tree growth afforded no safe retreat, and usually when surprised they came at once to the ground and dashed off into the thorn scrub. On Gebel Fazogli we watched a troop of these monkeys on several mornings. They spent much time on the ground or running about among the rocks, searching for fruits of various small trees. The two specimens brought back were both old males, found singly on the Blue Nile at El Mesharat and Magangani near Roseires respectively.

On the Dinder River we saw small troops of these monkeys along the banks at several places, particularly at Kuka; on one occasion Dr. Phillips came upon a small company of them at Um Orug scolding a leopard that was crouching among thick bushes.

An old male shot on the Blue Nile at Magangani had a curiously deformed skull. One side of the braincase, orbit, and jaw had developed at a much slower rate than the other so that the long axis of the skull was turned upon itself, and much deformation of the jaw with resorption of the condyle had taken place.

## LITERATURE.

ANDERSEN, K.

1912. Catalogue of the Chiroptera in the collection of the British Museum. Second edition, **1**. Megachiroptera. London.

COTTON, W. B.

1912. Sport in the eastern Sudan from Souakin to the Blue Nile. London.

HEUGLIN, T. VON.

1861. Beiträge zur Fauna der Säugethiere N. O.-Afrika's. Nova Acta Acad. Leop.-Carol., **29**, art. 8, 24 pp., 1 pl.  
 1863. Ueber die Antilopen und Büffel Nordost-Afrika's. Nova Acta Acad. Leop.-Carol., **30**, art. 2, 32 pp., 3 pls.  
 1864. Beiträge zur Zoologie Central-Afrika's. Nova Acta Acad. Leop.-Carol., **31**, art. 7, 15 pp., 1 pl.  
 1877. Reise in Nordost-Afrika. Schilderungen aus dem Gebiete der Beni Amer und Habab nebst zoologischen Skizzen und einem Führer für Jagdreisende. Braunschweig, 2 vols.

HEUGLIN, T. VON. and FITZINGER, L. J.

1867. Systematische Uebersicht der Säugethiere Nordost-Afrika's mit Einschluss der Arabischen Küste, des rothen Meeres, der Somali- und der Nilquellen-Länder, südwärts bis zum vierten Grade nördliche Breite. Sitzb. Kön. Akad. wiss. Wien, math.-nat. cl., **54**, pt. 1, p. 537-611.

JOHNSON, I. C., JR.

1903. Sport on the Blue Nile; or, six months of a sportsman's life in central Africa. London.

LYDEKKER, R.

1907. The ears as a race-character in the African Elephant. Proc. Zool. soc. London, 1907, **1**, p. 380-403.

MATSCHIE, P.

1902. Ueber die individuellen und geographischen Abänderungen der Ginsterkatzen. Verh. V Intern. zool. congr. Berlin, p. 1128-1144, 1 pl.

POCOCK, R. I.

1905. On the Greater Kudu of Somaliland. Proc. Zool. soc. London, 1905, **1**, p. 139-142.

RÜPPELL, E.

1826. Atlas zu der Reise im nördlichen Afrika. Säugethiere bearbeitet von Dr. Med. Ph. J. Cretzschmar.  
 1835. Neue Wirbelthiere zu der Fauna von Abyssinien gehörig, entdeckt und beschrieben. Säugethiere. Frankfurt a. M.

SUNDEVALL, C. J.

1843. Om Professor J. Hedenborgs insamlingar af Däggdjur i Nordöstra Africa och Arabien. Kongl. Svenska vet.-acad. Handl. for 1842, 1843, p. 189-244, pl. 2-4.

THOMAS, O.

1903. On some mammals collected by Capt. H. N. Dunn, R. A. M. C., in the Soudan. Proc. Zool. soc. London, 1903, **1**, p. 294-301.

WINTON, W. E. DE.

1900. On the mammals obtained in southern Abyssinia by Lord Lovat during an expedition from Berbera to the Blue Nile. Proc. Zool. soc. London, 1900, p. 79-84.
1901. Notes on bats of the genus *Nyctinomus* found in Africa, &c. Ann. mag. nat. hist., ser. **7**, **7**, p. 36-42.

WROUGHTON, R. C.

1906. Notes on the genus *Tatera*, with descriptions of new species. Ann. mag. nat. hist., ser. **7**, **17**, p. 474-499.
1910. Some servals and an *Otomys* from East Africa. Ann. mag. nat. hist., ser. **8**, **5**, p. 205-207.
1911. List of a collection of mammals made by Mr. A. L. Butler on the Upper Nile. Ann. mag. nat. hist., ser. **8**, **8**, p. 458-462.